# BI Global Battery-Electric Vehicles: Race to the Top

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Bloomberg Intelligence

## Contents

**BI Global Battery-Electric Vehicles: Race to the Top**

# Volkswagen Poised to Swipe Tesla's BEV Crown in Race to the Top

Global battery-electric vehicle (BEV) demand is likely to move at a varying pace regionally, with Tesla set to retain its global sales crown for at least another year, aided by a new EU factory. However, Volkswagen is poised to overtake the US company in 2024 and already leads in Europe. Execution will be key to encroaching on Tesla's $750 billion market capitalization.

Global automakers will challenge Tesla via an impending wave of competing models, though profit incentives are limited amid rising battery costs and a lack of scale. That may change in 2025-26, as more legacy brands achieve critical mass on new-generation models with proprietary software. Yet such bold BEV ambitions have done little to prevent crisis-level multiples, stoked by recession fears, rising interest rates, supply-chain constraints and inflation.

# Legacy Automaker BEV Execution Lacking; Uptake Varies by Region

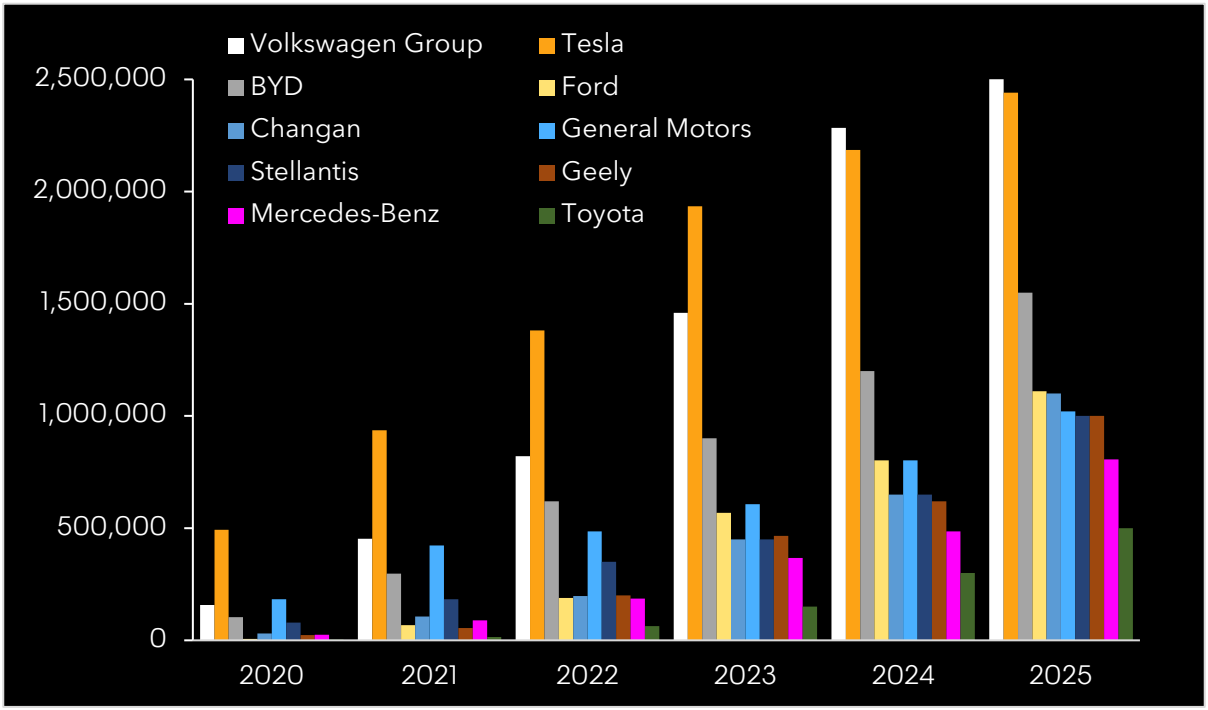
Tesla's valuation and battery-electric vehicle sales crown are yet to be challenged by incumbent automakers, whose disappointing 1Q BEV sales mix highlights the difficulty in executing bold ambitions amid shortages, rising costs and a scramble to add battery capacity. Our scenario analysis suggests a 15% global battery electric-vehicle market share in 2025 vs. 6% in 2021.

## Tesla, VW Jostle for BEV Leadership as Peers Lag Behind

Tesla's new EU capacity and buoyant global demand should enable it to retain its sales crown for at least another year, though Volkswagen is hot on its heels and could overtake in 2024. The latter already enjoys a leading market share in Europe, but this dominance needs to be replicated in other regions, particularly China, where its BEV share through April was only 3.5% vs. 15% for the overall market. China's BYD is set to become the third-largest BEV player in 2022 and may exceed 1 million units annually in 2024.

Despite angling to be regarded as one of the leading legacy BEV brands, Mercedes' ambitious plan to have a 50% electric vehicle (xEV) sales mix by 2025 -- with BEVs comprising the majority -- far outstrips its lackluster 4% mix in 2021 and 1Q. The company aims to double this figure by year-end.

**BEV Volume by Automaker (Units)**



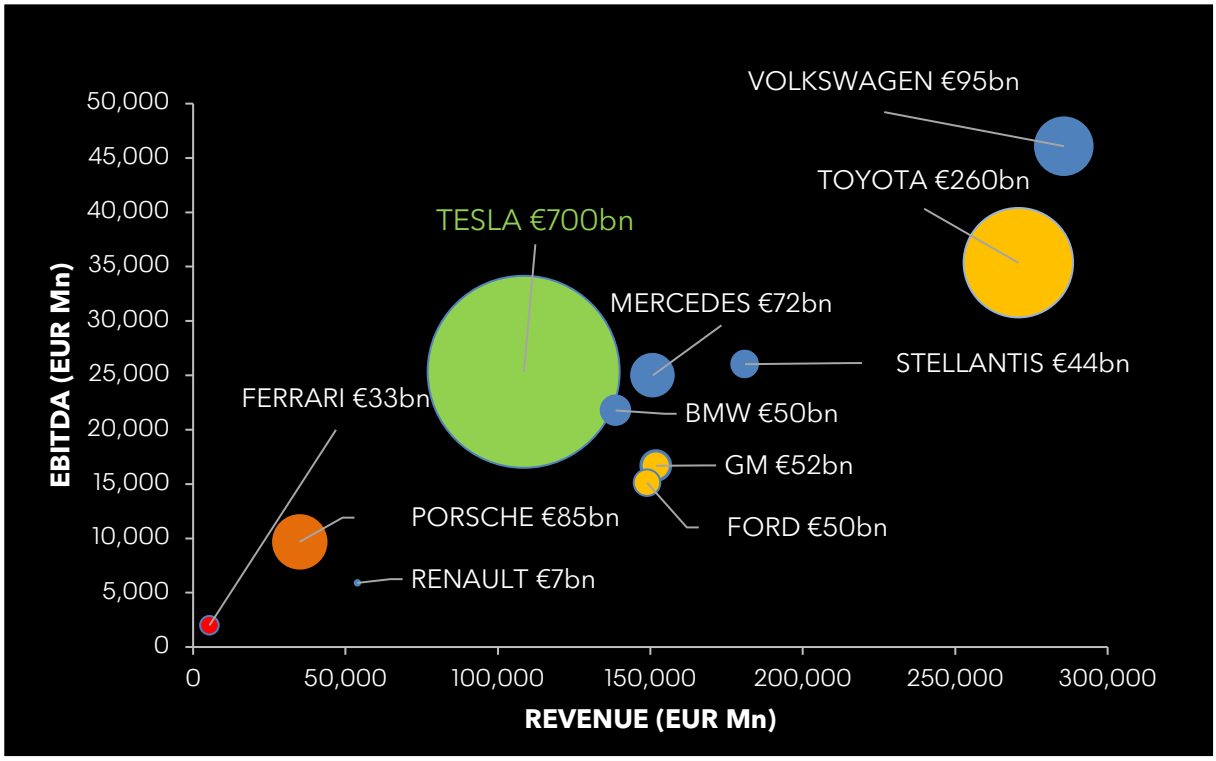

Source: Company Filings, Bloomberg Intelligence Estimate

## Porsche IPO Offers VW a Solution to BEV Spinoff Issue

Legacy automakers vying to reduce the valuation gap vs. Tesla's $750 billion market cap are unlikely to succeed in divesting BEV-related assets that are intertwined with their combustion operations, while the execution of bold 2025 plans to boost their multiples may be back-end loaded. Volkswagen is the exception: The company is on track to launch an IPO of its Porsche brand in 4Q, worth 85 billion euros using our scenario analysis employing a luxury-based multiple. Its potential 30% BEV sales mix in 2023 and more than 45% in 2025 is significantly ahead of peers and may attract a higher, more tech-oriented multiple.

German automakers -- which are still jostling to be seen as the leaders of the legacy transition – only averaged a BEV sales mix of 5% in 1Q, partly explaining their low multiples despite record margin. This comes alongside recession fears, rising rates, supply-chain constraints and inflation.

**2023 Sales Estimates vs. Ebitda; Market Cap (Relative Circle Size)**



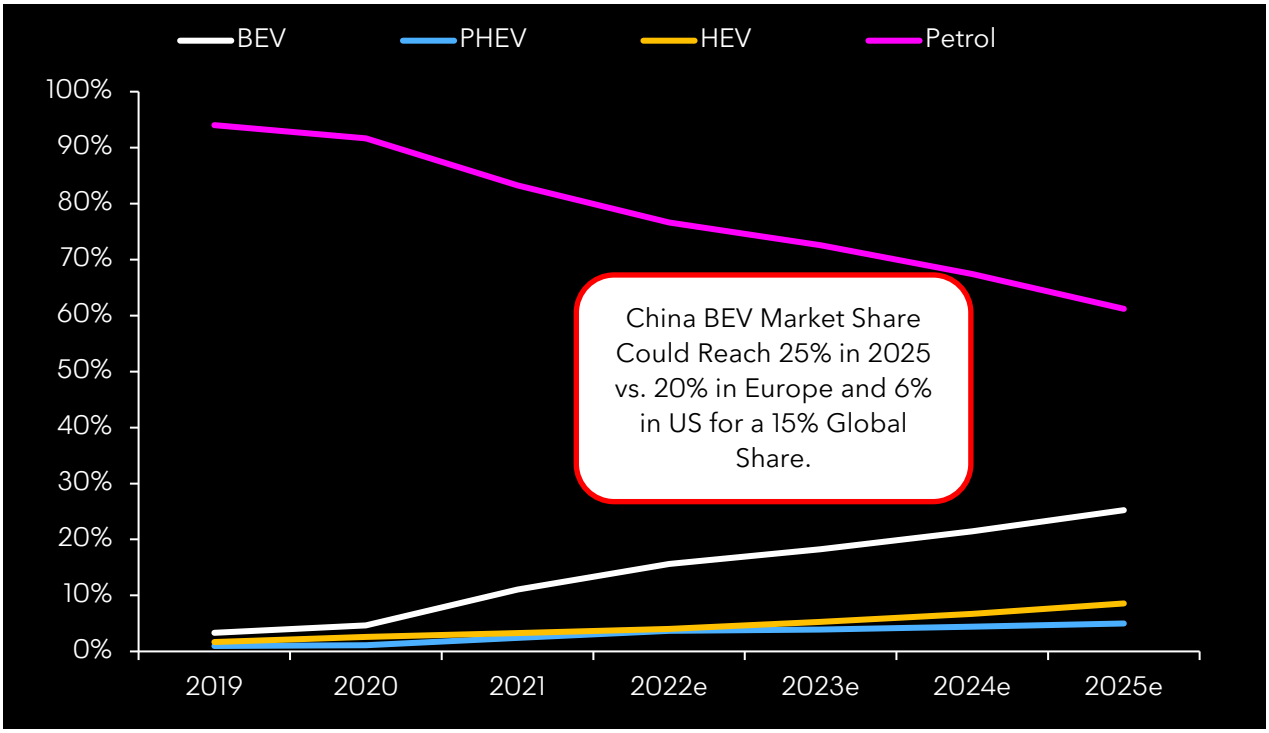

Source: Bloomberg Intelligence

## 15% Global BEV Sales Mix by 2025; China and Europe Lead

Despite the hyperbole, our scenario analysis indicates the global battery electric-vehicle sales mix will only reach 15% in 2025 vs. about 6% in 2021, with China remaining the dominant region (25% vs. 11% in 2021). Though evolving European emission legislation will enforce the accelerated uptake of electrified vehicles, the region is only likely to retain the No. 2 position globally, with a 20% market share in 2025 (or about 3 million units) vs. 9% in 2021.

The US and other areas will lag behind, with the former's BEV share expected to hit 6% in 2025 vs. 3% in 2021. Our scenario assumes that ambitious battery-production-capacity plans are achieved amid supply constraints and inflationary pressure.

**China's Sales Mix by Powertrain**




Source: Bloomberg Intelligence

## Tesla Volume Runway May Shorten as Automaker Peers Get Serious

Model 3 and Y unit volume, as well as automotive gross profit, are Tesla's most critical drivers as per our Bloomberg Interactive Calculator. Operating success hinges on new factories in Berlin and Austin, Texas, which are ramping up to maintain an average volume growth of 50% through 2023. Unit sales growth of 53% in 2022 and 39% in 2023, based on consensus, signals a likely slowdown in vehicle deliveries as established automakers commit to meaningful BEV volume. Our calculator's assumptions suggest an automotive gross margin hovering around 30% for 2022 and 2023, reinforcing that scale across common platforms can drive profitability, though results are handicapped by diminishing the contribution from 100% margin regulatory credits.

The Bloomberg Interactive Calculator uses Bloomberg's detailed consensus estimates to create an integrated three-statement financial model.

**Bloomberg Interactive Calculator**

Tesla Inc
TSLA US

Bloomberg Interactive Calculator

| | 2019 FY A | 2020 FY A | 2021 FY A | 2022 FY E | 2023 FY E |
|---|---|---|---|---|---|
| | 12/31/2019 | 12/31/2020 | 12/31/2021 | 12/31/2022 | 12/31/2023 |
| Calculator Summary | | | | | |
| Total Revenue | 24,578 | 31,536 | 52,358 | 93,213 | 126,716 |
| Consensus | | | | 86,795 | 114,831 |
| Model 3/Y | 300,885 | 442,511 | 911,242 | 1,389,989 | 1,933,270 |
| *Y/Y Change* | *106.3%* | *47.1%* | *105.9%* | *52.5%* | *39.1%* |
| Consensus | | | | 1,389,989 | 1,933,270 |
| *% Deviation From Consensus* | | | | *0.0%* | *0.0%* |
| Assumption - Model 3/Y | | | | 1,389,989 | 1,933,270 |
| Total Automotive Gross Profit | 3,879 | 6,977 | 13,410 | 25,781 | 34,883 |
| Gross Margin (%) | 18.6% | 25.6% | 29.3% | 30.5% | 30.1% |
| *Y/Y Difference* | *-4.8%* | *7.0%* | *3.7%* | *1.2%* | *-0.3%* |
| Consensus | | | | 30.5% | 30.1% |
| *% Deviation From Consensus* | | | | *0.0%* | *0.0%* |
| Assumption - Gross Margin (%) | | | | 30.5% | 30.1% |
| Assumption Override - Gross Margin (%) | | | | | |

Consensus Output

Consensus Input

Source: Bloomberg Interactive Calculator, Company Filings

# Europe: Volkswagen Leading the Chase

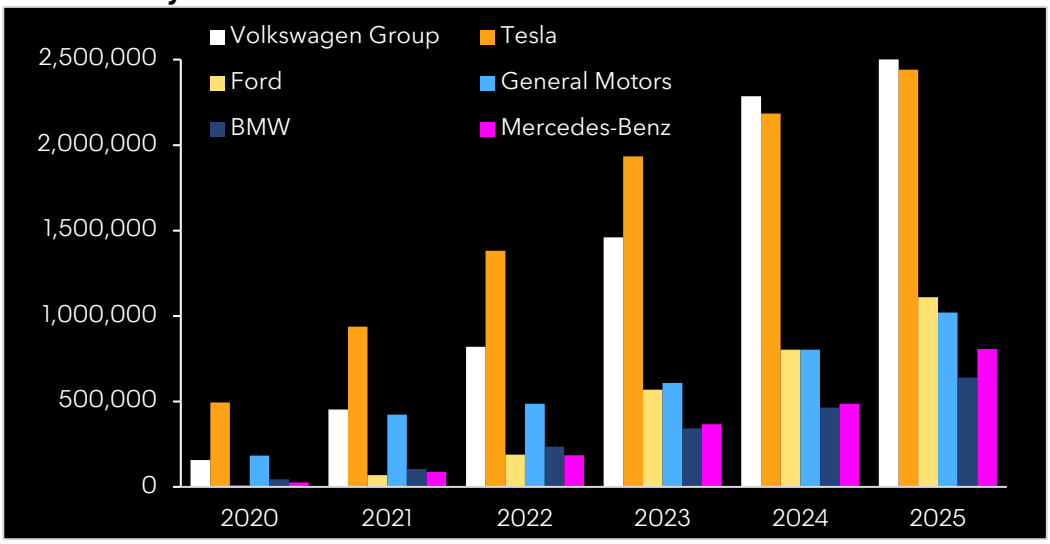
Volkswagen appears poised to overtake Tesla on BEV volume in 2024 as its MEB-platform-based BEV margin improves via increased global scale. Execution is key, and EU automakers' lackluster BEV mix near-5% in 2021 looks set to double this year, though further growth may be tempered until cost parity is achieved with combustion engines in 2024-25.

## Volkswagen Poised to Take Pole Position in BEV Race

Having originally expected Volkswagen to overtake Tesla on BEV volume in 2023, consensus now calls for the US automaker to double sales in 2023 vs. 2021 on new capacity ramping up in Germany and Texas. However, this assumes Tesla's 2023 Cybertruck launch, which is questionable. Our scenario analysis suggests VW is on track to become the BEV market leader in 2024, assisted by the launch of 16 new models, including the Audi Q6, A4 e-tron, A6 e-tron, ID 5/6, ID Buzz and Porsche Macan. This comes as part of a goal to achieve a 25% BEV sales mix by 2025-26. These will better compete on range and technology, widening the volume gap vs. legacy peers.

VW's plan could herald a fundamental shift toward battery electric vehicles, using its global scale to achieve the top end of its new 8-9% 2025 Ebit-margin target early, ahead of consensus.

**BEV Volume by Automaker**




Source: Bloomberg Intelligence

## Battery Prices Key for BEV Cost Competitiveness

Battery prices remain critical to cost competitiveness, and Volkswagen is investing as much as 30 billion euros in the supply chain, including the opening of six new battery-cell plants in Europe by 2030. The company is also hedged on commodities. Sweden's Northvolt starts production on premium cells for VW in 2023. Audi's CFO has highlighted its progress, with its midsize Q4 BEV SUV now having a similar margin to its internal-combustion-engine (ICE) counterpart, the Q3. The brand benefits from economies of scale and high-volume MEB platform.

Though BMW's fifth-generation iX batteries are 50% cheaper than previous versions, their margin is dilutive vs. the ICE X5, based on our analysis. We view Mercedes' first-generation EQ models (except EQS) as having below-par margins.

**Automakers' Strategies to Reduce Battery Costs**

| | In-house production | New cell design | New pack design | Improved manufacturing process | Low-cost chemistry |
|---|---|---|---|---|---|
| VW | 240GWh in Europe by 2030 | Unified prismatic cell | Cell-to-pack, then cell-to-vehicle | Dry coating | High-Ni, Mn-rich, LFP |
| Tesla | 3TWh Globally by 2030 | 4680 cell | Cell-to-vehicle | Dry coating, pre-lithiation | High-Ni, Mn-rich, LFP |
| GM | Ultium Cells JV, 70GWh under construction | Ultium pouch cells | Ultium pack, allows multiple configurations | 'advanced' processes | NMCA |
| Ford | BlueOvalSK JV, 60GWh planned | IonBoost pouch cell | Flexible BEV architecture | N/A | LFP, Ni-based chemistry |
| Stellantis | ACC JV, 130GWh by 2025 | N/A | Four platforms (small, medium, large & frame) | N/A | LFP, Ni-based chemistry |

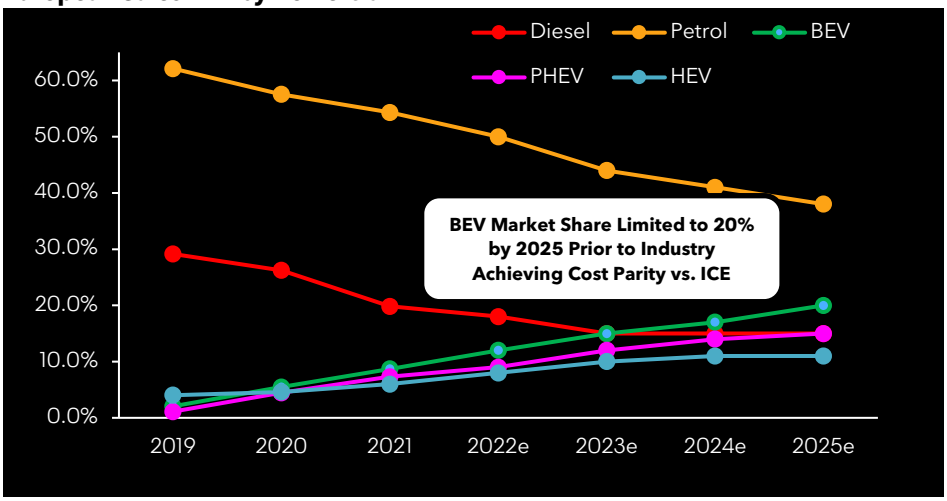
Source: BloombergNEF, Company announcements

## BEV Sales May Exceed 3 Million by 2025, Claim 20% Share

European battery-electric vehicle market share is on track to hit 12% in 2022 -- having reached 9% in 2021 (more than 1 million units) -- though it's not until 2025 that our scenario analysis suggests annualized sales will exceed 3 million units to achieve a 20% share. This assumes that ambitious battery-capacity plans are executed successfully. Indeed, BEV share is already in the double digits in the three largest European auto markets, with the UK leading the way, followed by Germany and France. In the first four months of 2022, the UK had a 14% BEV mix despite government subsidies being significantly lower than in other countries in the top 10.

The middle of this decade will also coincide with a wave of dedicated BEV platforms, new-battery technology and digitalization that will likely make the vehicles more affordable and desirable to consumers.

**European Sales Mix by Powertrain**




Source: Bloomberg Intelligence

## BEV Growth Initially Skewed to Premium Segment

Competition for Tesla's market-leading Model 3 and Y in Europe is likely to come from premium brands, as wealthier consumers can afford BEVs' higher price points and often have more flexibility via owning another internal-combustion-engine vehicle. It's no surprise that the UK and Germany lead in battery-electric vehicle sales, given BMW data suggest these countries have the highest market share of premium sales at 31% and 29%, respectively, vs. a global average of 12.5%. A wave of new models from BMW, Mercedes and Audi provide a broader selection for those who favor SUVs, offering extended ranges and greater connectivity.

These new BEVs will erode what's effectively been a premium-segment monopoly for Tesla, giving consumers a much wider choice via comparable ranges and -- in the case of the Porsche Taycan and Audi GT -- faster charging times.

**Premium-Segment Share**


Source: BMW, Bloomberg Intelligence

## Ferrari SF90 Also Proves Electrification Can Be Profitable

Ferrari is proving that the transition to EVs can be highly profitable when you charge a mere £400,000 for the SF90 PHEV with an anticipated 50% Ebitda margin and has helped boost China sales. Moreover, it begins Ferrari's electrification, which now includes the 296 GTB twin-turbo 2.9L V6 PHEV positioned above Ferrari's highest volume internal-combustion engine (ICE) model, the F8 Tributo.

The SF90 commemorates the 90th anniversary of Scuderia, Ferrari's racing team, and its name "stradale," meaning "for road," is appropriate for a hypercar that's one of the fastest and most profitable unlimited production cars. It has an electric range of 16 miles and a top speed of 210 mph with emissions of 154 gCO2/Km vs. Ferrari's average EU fleet emission of 294g in 2021, according to JATO. Its 1,000-bhp powertrain accelerates to 62 mph in 2.5 seconds.

**SF90 Ebitda Contribution Est.**


| | 2021E | |
|---|---|---|
| Units | Euros | Euros (Mn) |
| List Price (Est.) | 450,000 | 900 |
| Ex-Factory Price | 313,525 | |
| Options / Personalisation | 87,787 | |
| Revenue | | 361 |
| Ebitda | | 180 |
| Ebitda Margin | | 50% |
| % of Group Ebitda | | 12% |

Source: Bloomberg Intelligence, Company Website

## Accelerating Battery Electric-Vehicle Ambitions

EU brands are jostling to be seen as leading legacy automakers' BEV transition, with VW's 25% global BEV sales mix target by 2025-26 equating to about 2.5 million units annually. VW benefits from emissions mandates in its two largest markets (Europe and China) and targets a 50% mix by 2030. This was eclipsed by Mercedes now targeting a 50% xEV sales mix by 2025 (from 25%) --skewed towards BEVs -- assisted by a BEV option being offered on all models. BMW has committed to 15 BEV models by 2023, targeting a 30% xEV sales mix by 2025.

VW's accelerated EV rollout will require 60 billion euros in investment by 2026, compared with Mercedes' 40 billion euros to 2030. Renault's new plan is for more than 10 BEVs available by 2025 and Stellantis targets the total cost of ownership for EVs to match ICEs by 2026.

**German Automakers BEV Ambitions**

| | | Q421 Share % | 2021 Units | 2021 Share % | 1Q22 Units | 1Q22 Share % | 2022e Units | 2022e Share % | 2025e Units | 2025e Share % | | 2030e Share % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BMW | PHEV | 8.9% | 224,461 | 8.9% | 54,380 | 9.1% | 250,000 | 9.5% | 400,000 | 13.1% | | | |
| | BEV | 7.5% | 103,855 | 4.1% | 35,289 | 5.9% | 220,000 | 8.4% | 646,800 | 21.2% | | 50.0% | Target |
| | Total xEV | 16.4% | 328,316 | 13.0% | 89,669 | 15.0% | 470,000 | 17.9% | 1,046,800 | 34.3% | >30% Target | | |
| | Total Deliveries | | 2,521,525 | | 596,907 | | 2,627,000 | | 3,050,000 | | | | |
| | Auto Ebit Margin % | | | 8.8% | hb | 9.8% | | 7-9% | 8-10% Target | | | | |
| MERCEDES | PHEV | 1.1% | 137,458 | 6.6% | 45,900 | 9.2% | 200,000 | 9.7% | 477,626 | 20.0% | | | |
| | BEV | 6.7% | 90,000 | 4.3% | 21,900 | 4.4% | 180,000 | 8.8% | 811,965 | 34.0% | | 100.0% | Ambitio |
| | Total xEV | 9.3% | 227,458 | 10.9% | 67,800 | 13.5% | 380,000 | 18.5% | 1,289,591 | 54.0% | Up to 50% Target | | |
| | Total Car Deliveries | | 2,093,476 | | 501,600 | | 2,055,562 | | 2,388,132 | | | | |
| | Vans BEV | | 9,301 | 2.8% | | | | | | | | | |
| | Vans | | 334,210 | | | | | | 447,100 | | | | |
| | Car and Van BEV | | 99,301 | 4.1% | | | | | | | | | |
| | Total Car and Van | | 2,427,686 | | | | | | 2,835,232 | | | | |
| | Adj. Ebit Margin % (includes China JV) | | | 12.7% | | 12.6% | | 11.5-13% | 7-9% Mid-Range Target +10% Blue Sky Target | | | | |
| VOLKSWAGEN | PHEV | 0.0% | 309,500 | 3.5% | 50,740 | 2.7% | 434,288 | 5.0% | 1,001,500 | 10.0% | | | |
| | BEV | 8.3% | 452,900 | 5.1% | 99,064 | 5.2% | 809,994 | 9.3% | 2,649,036 | 26.5% | 25% Target - 2025 | 50.0% | Target |
| | Total xEV | 0.0% | 762,400 | 8.6% | 149,804 | 7.9% | 1,244,282 | 14.3% | 3,650,536 | 36.5% | | | |
| | Total Deliveries | | 8,882,000 | | 1,898,000 | | 8,685,762 | | 10,015,000 | | | | |
| | Ebit Margin % | | | 8.0% | | 7.7% | | 7-8.5% | 8-9% Target | | | | |

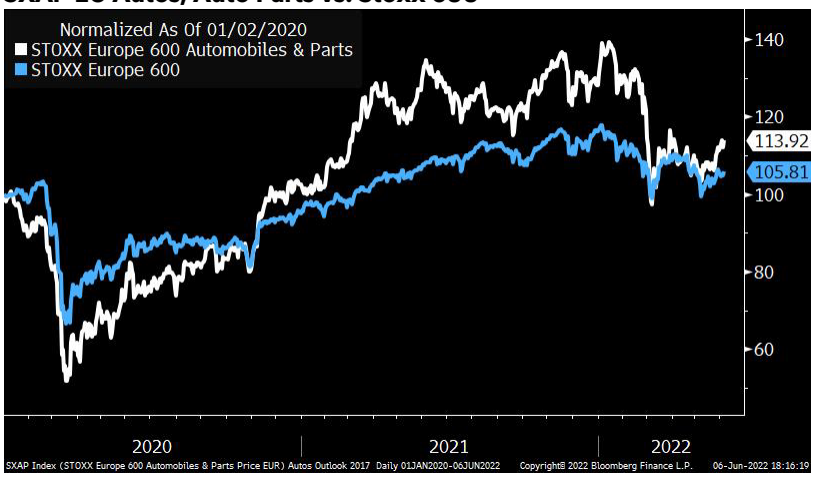
Source: Bloomberg Intelligence

## EU Automakers Outperformance Undone by Russia

The Stoxx 600 SXAP Auto (Price) Index has underperformed in 2022 -- following an all-time high on Jan. 13 -- amid the Russian-Ukraine war, having outperformed the wider market in 2021 given better-than-expected results and having gained a modicum of tech recognition via ambitious battery-electric vehicle rollout plans. It also outperformed in 2020 -- the first year since 2017. Despite continued supply constraints impacting production, 1Q results were better than expected due to a strong price mix and lowered breakeven points on the back of pandemic-prompted restructuring.

European BEV market share has risen to 11% in 1Q vs. 9% in 2021 -- 15% in December -- despite the vehicles' high cost and a lack of charging infrastructure, assisted by widespread subsidies and rising fuel costs.

**SXAP EU Autos, Auto Parts vs. Stoxx 600**



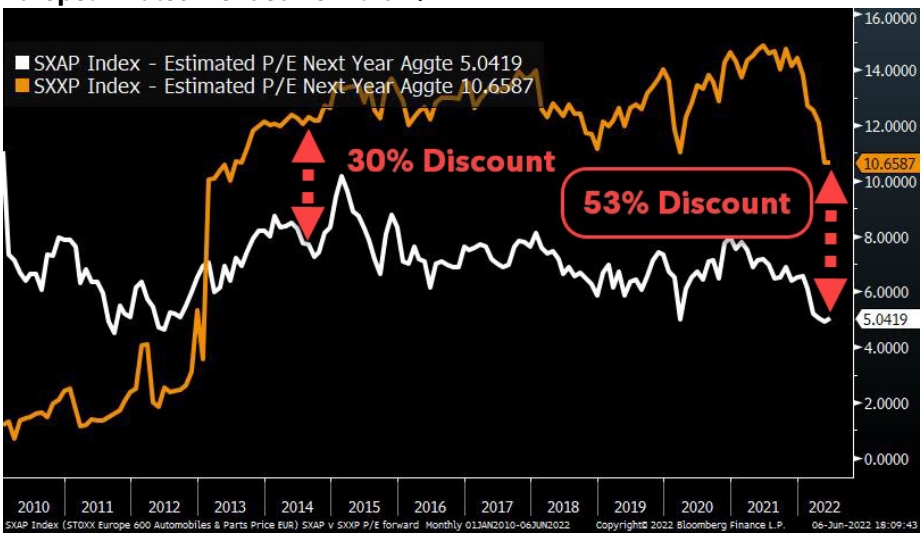

Source: Bloomberg Intelligence

## Price-to-Earnings Multiple Remains Low

A slump in EU automotive stocks since January -- despite strong 1Q results -- has widened the EU auto sector's P/E discount vs. the overall market, from 53% in November to 56% vs. a 30% historical average. The valuation gap with Tesla and other pure-play, battery-electric vehicle start-ups has also widened. SXAP consensus expectations remain high, and the call for a 10% Ebit gain in 2022 is still 40% above 2017, the most recent peak in global auto demand.

The SXAP has underperformed the market by 500 bps in 2022, given recession fears, supply-chain constraints and surging commodity inflation amid the Russia-Ukraine war. Interestingly, the consensus 2022-23 Ebit for EU automakers has barely moved since the beginning of March, meaning German and French peers trade, on average, at 1.2x 2023 EV-to-Ebitda vs. Tesla's 29x.

**European Autos Blended Forward P/E**




Source: Bloomberg Intelligence

# China's Regulatory Rod Puts BEVs in Fast Lane

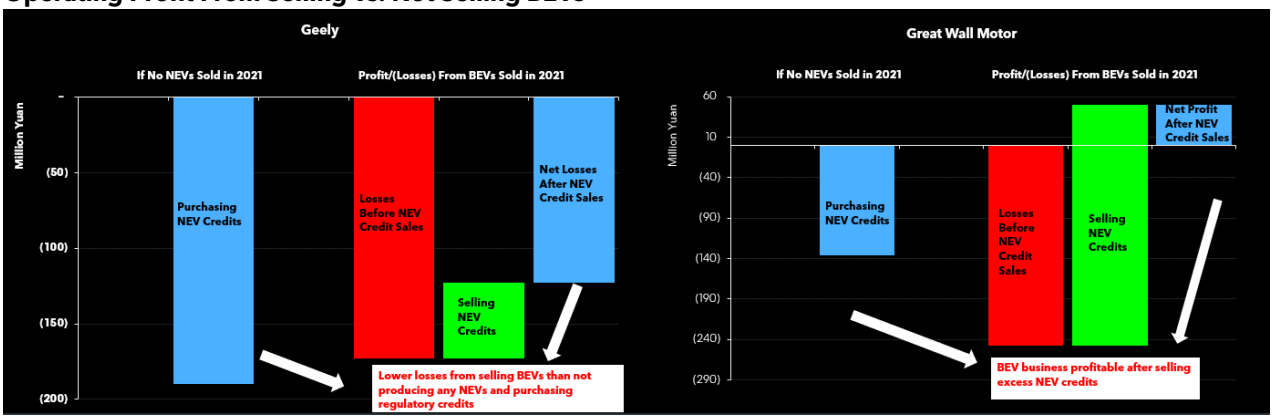
Staying out of the BEV game may become a costly option for China automakers, our analysis suggests. Manufacturers risk losing more money by not producing EVs than by cranking them out in large numbers, even as higher output and more competitors give industry rivalry greater intensity.

## Building Unprofitable BEVs Beats Buying Costly Credits

China's new energy vehicle (NEV) credit program could carry a bigger stick and a smaller carrot to motivate more automakers to boost BEV sales and production. Our analysis of Geely and Great Wall Motor's EV earnings suggests operating losses from BEVs are probably lower than the cost of buying credits if it sold no NEVs at all. With more excess credits available for sale, Great Wall may even squeeze out a modest profit from its BEV operations. Our calculations assume NEV credits trade at 1,200 yuan each this year, at the midpoint of the 1,000-1,400-yuan range forecasted by the China Automotive Technology and Research Center.

VW, the auto group struggling with 2020's largest NEV credit shortfall, launched three "ID." models last year to boost battery-electric vehicle output. Plug-in hybrids usually earn fewer NEV credits a unit than BEVs.

**Operating Profit From Selling vs. Not Selling BEVs**

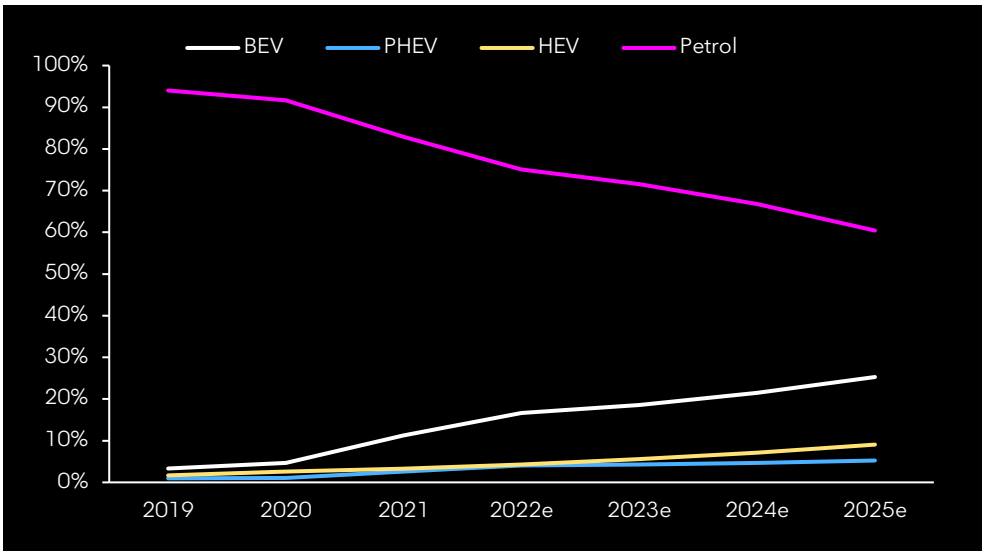



Source: Bloomberg Intelligence

## BEVs' 25% Sales Share Within Reach on NEV Credits

China's carrot-and-stick approach to stoking EV sales could push BEVs to account for 25% of all passenger vehicle purchases by 2025, based on our scenario analysis. BEV sales in China have surged since the launch of the country's NEV credit program despite erratic component supply. Automakers can earn more credits by producing and selling all-battery models, yet most car buyers steer clear and are apprehensive about their affordability, driving ranges, and a scarcity of convenient charging points.

**China Sales Mix by Powertrain**

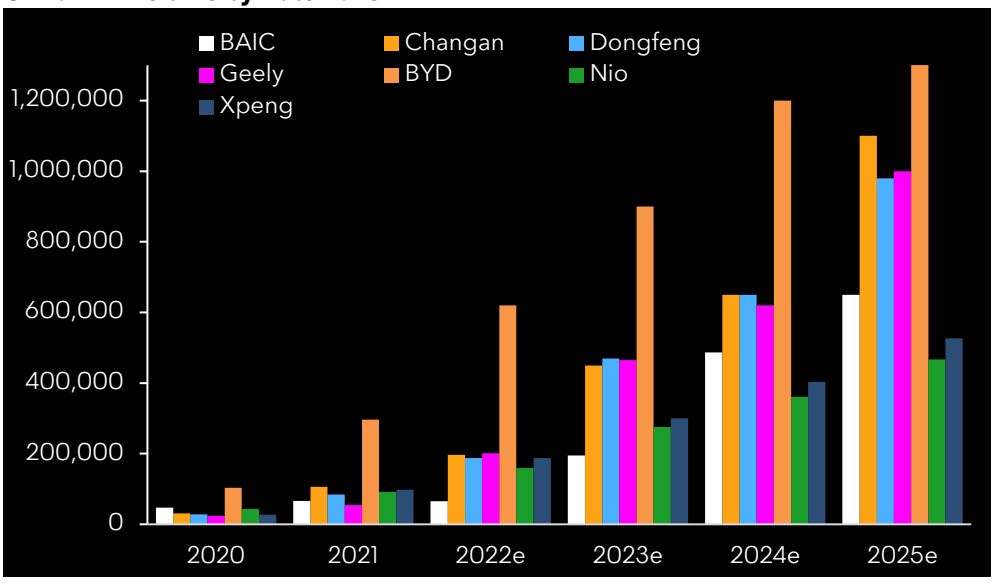



Source: Bloomberg Intelligence

## BYD Faces Challenge From Policy-Driven Competition

China's battery-electric vehicle sales leader, BYD, will contend with stiffer competition in the next two to three years. Local automakers such as Geely and Changan -- and EV start-ups Nio and Xpeng – are rolling out new models, putting them head-to-head with BYD in the push to meet swelling demand. Electric-vehicle sales will probably slow next year when purchase subsidies dry up, yet should stage a comeback after that. China's NEV credit program favors greater consumer choices, which may foster fragmentation in its domestic EV market.

**China BEV Volume by Automaker**

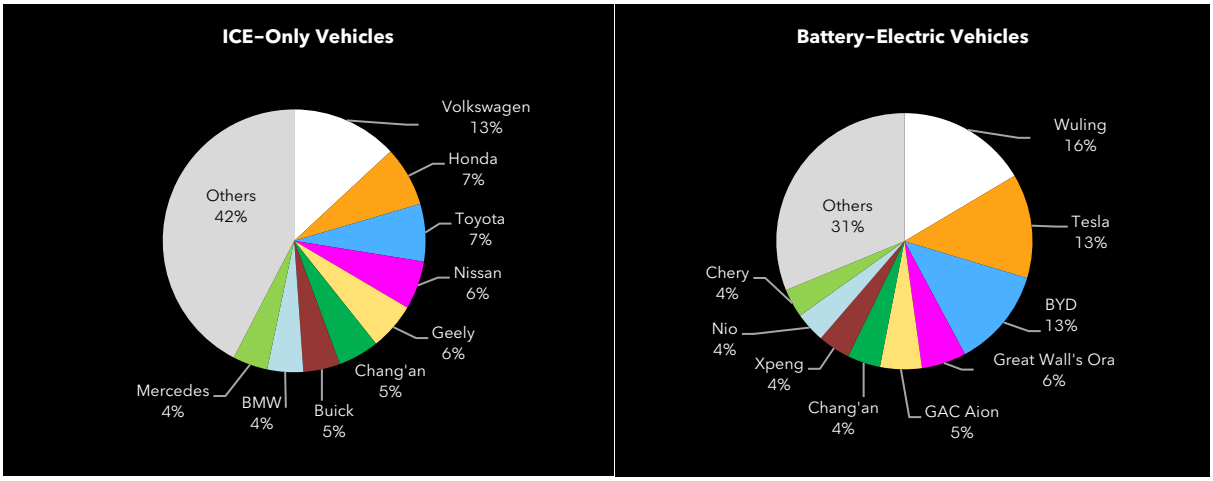



Source: Bloomberg Intelligence

## VW, BMW's EVs Face Pressure Beyond Pricing

Volkswagen, BMW and other foreign brands' BEV sales in China may come at the expense of their pricing and profitability, having ceded first-mover advantages to Tesla and local makers. BYD, Nio, Xpeng and China's other homegrown electric-vehicle makers are rapidly closing the technology and branding gaps with their European rivals, wooing consumers not only with driving range, power and driving assisted add-ons, but also with lower prices, luxury trim, voice-activated window controls and virtual-reality entertainment. The fierce competition and the credit program promote technol advances and greater affordability, putting BEVs on track for 25% of China's new car sales by 2025 vs. 11% in2021, based on our calculations.

**China Auto Market Share by Brand**



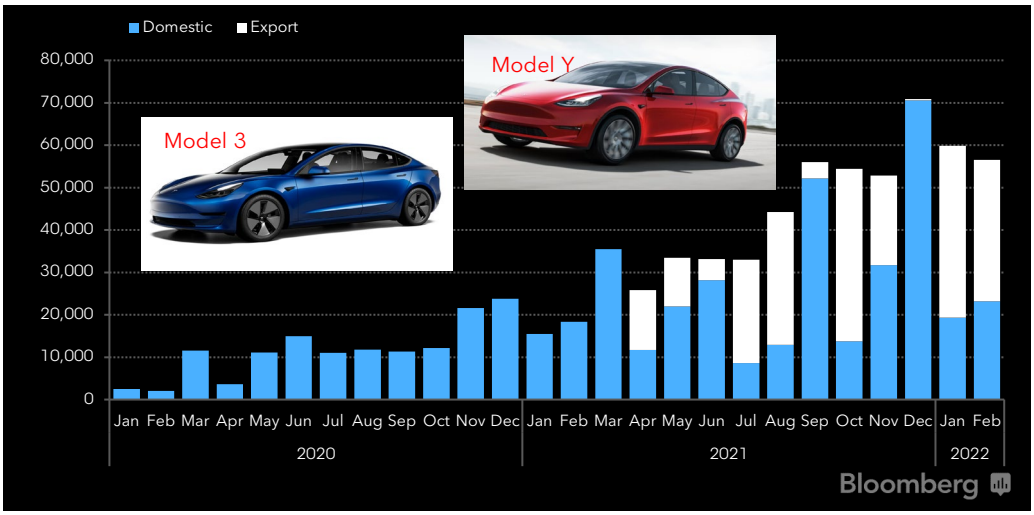

Source Bloomberg Intelligence

## Tesla May Miss Out on China EV Uptake

Tesla's thin lineup of just two locally built models -- and the repositioning of its Shanghai plant as an export hub -- may cost it more market share in China. Its most affordable, standard-range Model 3s and Ys are already in showrooms, while the next $25,000 car may not arrive until at least 2024. More exports have resulted in longer wait times for domestic delivery, which now stretches to at least 10-14 weeks for Model Ys and up to four to five months for Model 3s. This may prompt consumers to opt for rivals such as Nio, BYD and VW, which are rolling out new EVs and ramping up output to capture demand.

Tougher rivalry and exporting a third of its vehicles squeezed Tesla's share of China's BEV market to 13% in 2021 vs. 16% a year earlier. BYD and VW each grew their market shares by about 1.5 percentage points last year.

**Tesla Shanghai Factory Shipments (Units)**



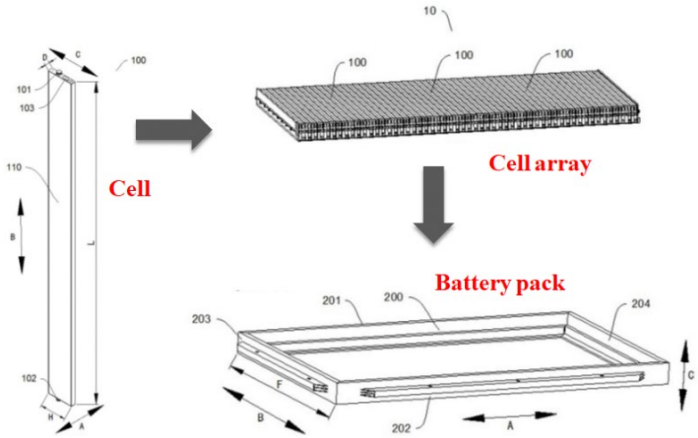

Source: Bloomberg Intelligence

## Battery Innovation Helps EVs Surmount Cost Hurdles

Cost-competitive lithium iron phosphate (LFP) batteries are critical for automakers to keep BEVs affordable while minimizing the blow to their profits as they battle for share in the hypercompetitive China market. Battery makers CATL and BYD's innovation to directly integrate cells into packs without modules has boosted LFP batteries' energy density, powering longer driving ranges. Nickel's recent price rally further sharpens LFP's cost advantage vs. the more powerful but expensive, high-nickel NCM811 cells. Tesla and BYD are among the first to adopt LFP batteries, with Nio and Xpeng joining the fray last year.

Cheaper-priced LFP-battery versions accounted for more than 75% of Tesla's China deliveries in2021. The LFP chemistry is also safer than NCM, striking directly at consumers' concerns over battery-fire risks.

**BYD's Blade Battery Pack Design**



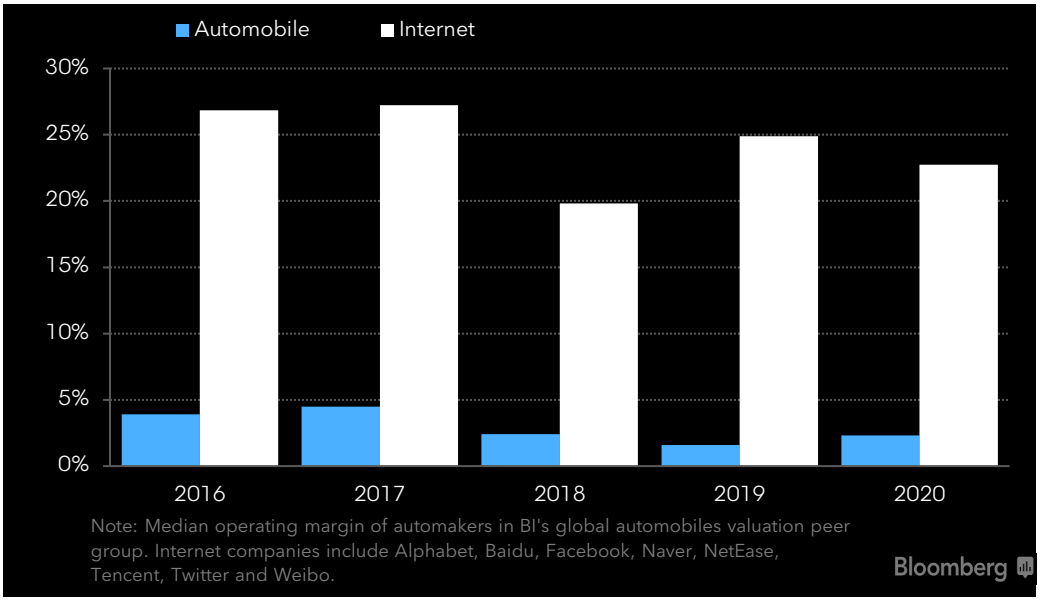

Source: BYD, FutureCar

## Data and Software Are Emerging Profit Engines

Automakers may need to look beyond vehicle designs and production efficiencies to profitability. Wider deployment of vehicle connectivity, advanced driver-assistance (ADAS) and eventually autonomous-driving systems could generate recurring revenue streams while carrying loftier margins than vehicle manufacturing. Xpeng's XPilot ADAS system could deliver gross profit margins exceeding 80%, based on our calculations, vs. a little over 10% for pure EV manufacturing.

The tremendous amount of data gathered from vehicle operations also brings value for analytics and a better customer experience. Facebook, Baidu and other Internet companies' superior margins vs. automakers suggest the potential profit upside of owning vehicle data.

**Industry Operating Margins**




Source: Bloomberg Intelligence

# Tesla's Top Rank in BEVs at Risk as Ford Courts Truck Sweet Spot

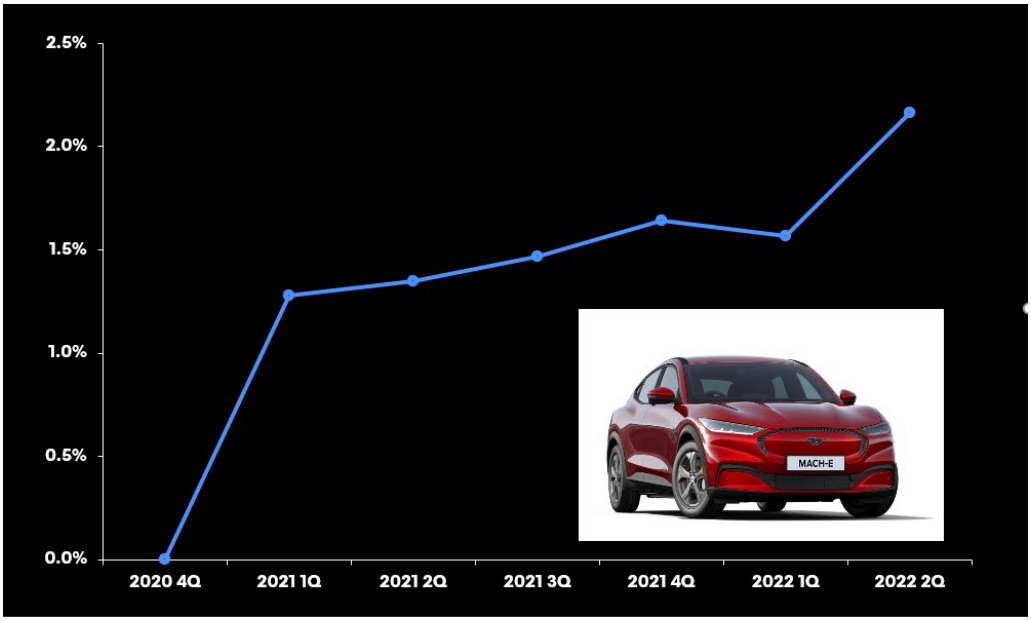
Ford is set to spin the electric vehicle narrative away from Tesla, with the F-150 Lightning getting a nearly year-long jump on the competition and making Ford the first automaker to ramp up production of a full-size battery-only pickup truck. General Motors and Tesla won't compete in the space before 2023, and Rivian's small scale makes it non-threatening.

## Ford Leads BEV Pickup Push Before Profit Economics Fully Sorted

If battery-electric vehicles are going to tip from 3% to a majority of new unit volume in the US, Ford and GM are the companies with the scale to make it happen. Ford's Lightning pickup is the first and potentially most important BEV from a legacy automaker during the transition. The company will make BEV inroads faster than GM, as the high volume -- though still output-constrained -- Lightning joins Mustang Mach-E to move Ford off its 1.4% BEV penetration for 2021. Ford has tilted its US sales mix to 95% light truck, including internal combustion F-Series representing 38% of domestic volume and 44% of retail revenue. Ford says BEVs will be 40% of sales by 2030.

Lightning and Mach-E are selling well above a $50,000 average transaction price that hints at breakeven and keeps demand in check for the nascent drivetrain tech.

**Ford BEV as % of US Unit Sales**



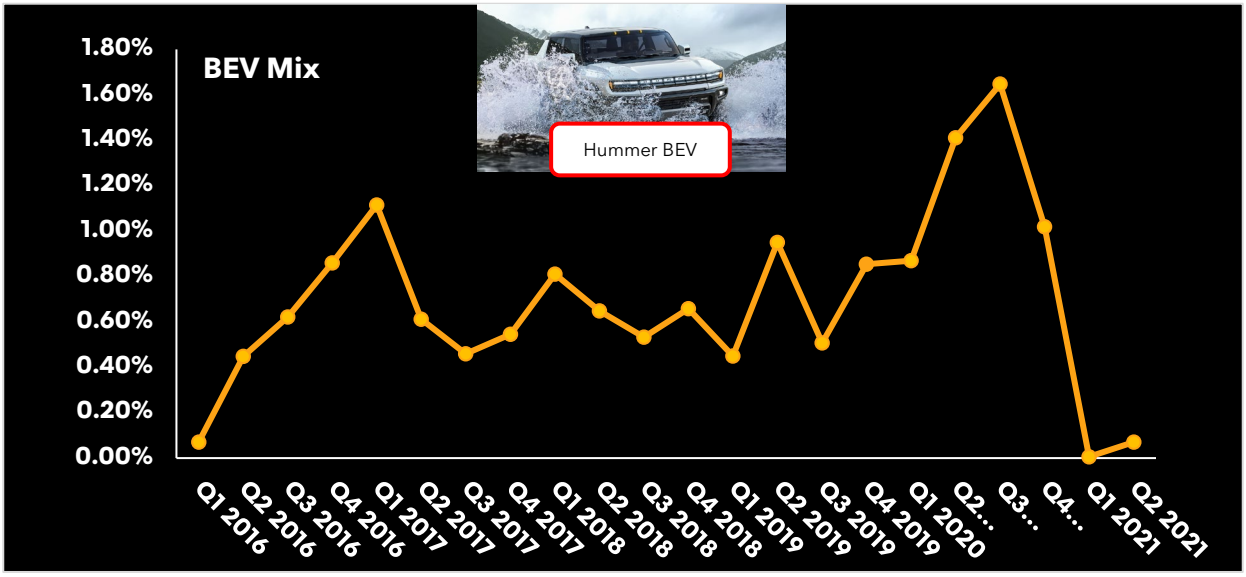

Source: Company Data, Bloomberg Intelligence

## GM Leaves Long Lead Time to 2035 Total EV Takeover

GM has opted to temper the launch pace of lower-priced, higher-volume battery-electric vehicle nameplates while awaiting improvement in profit dynamics -- with a goal of selling only BEVs by 2035. US vehicle mix for the automaker was 93% light truck in 2021 and only 1.1% BEV. Chevrolet Bolt EUV output will remain measured due to its unprofitable $37,680 average price as GM stays upmarket, with prices well above $60,000, and surrenders volume to Ford until the price of the Chevrolet Blazer EV -- due in spring 2023 -- drifts down to $40,000 and forces GM to decide between volume or margin somewhere around 2025.

Discontinuing internal combustion vehicles by 2035 while maintaining a profitable enterprise of the current size is fraught with uncertainty about raw material availability and costs and consumer demand over a 13-year time frame.

**GM, Ford U.S. BEV Sales Mix**




Source: Company Data, Bloomberg Intelligence

## Pure-Plays Lack Production Heft to Challenge Legacies

The fundamentals of Rivian and Lucid's production and deliveries have come under more scrutiny as markets adjust valuations for small-scale automakers that have never navigated macroeconomic shocks to their nascent supply chains. Both companies have cut early-stage production and delivery estimates as the availability of materials and cost increases change the profit dynamics of drivetrain tech, while high inflation and low inventory upset consumer demand. Lucid expects 14,000 deliveries, and Rivian sees 25,000 units in 2022 -- both almost certain to be lower than what Ford or GM sold in 2021.

Rivian and Lucid are yet to be profitable at the gross line, with the challenges of achieving scale intensifying in unfavorable macroeconomic and industry environments compounded by competing with established brands in a contracting market.

**Gross Profit by Quarter**

| Gross Profit (Mn USD) | Lucid | Rivian |
|---|---|---|
| 3Q2021 | -3.1 | -82 |
| 4Q2021 | -125.1 | -383 |
| 1Q2021 | -188.3 | -502 |
| 2Q2022 | -111.6 | -496 |
| 3Q2022 | -107.1 | -531 |

Source: Company Filings
Note: 2Q and 3Q 2022 are Bloomberg Consensus Estimates

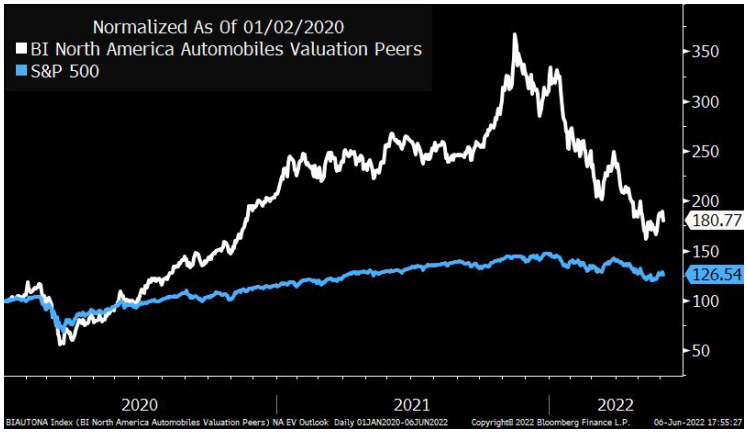
Source: Company Filings, Bloomberg Intelligence

## US Automakers Soar on Profit, EV Plans, Undone by Global Tumult

The group of North American automakers outperformed the broader S&P 500 by a growing margin beginning in July 2020, reaching a peak in November 2021, buoyed by technological recognition given to established manufacturers, only to get caught up in broader economic and geopolitical turmoil. Ambitious electric-vehicle rollout plans for Ford and GM, coupled with record profit earned on the back of a truck-rich product mix, allowed both companies to catch a valuation updraft. Pure-EV player Tesla, expanding installed capacity in Shanghai while unable to keep up with the profit haul of established peers and running largely unopposed in the space, continued its perceived dominance as the leader in EVs.

US BEV market share doubled to 3.3% in 2021, gradually gaining momentum as legacy and nascent producers begin to nibble at Tesla 70% share.

**North American Auto Peers vs. S&P 500**




Source: Bloomberg Intelligence

# Japan EV Market: Hybrid Takes Center Stage

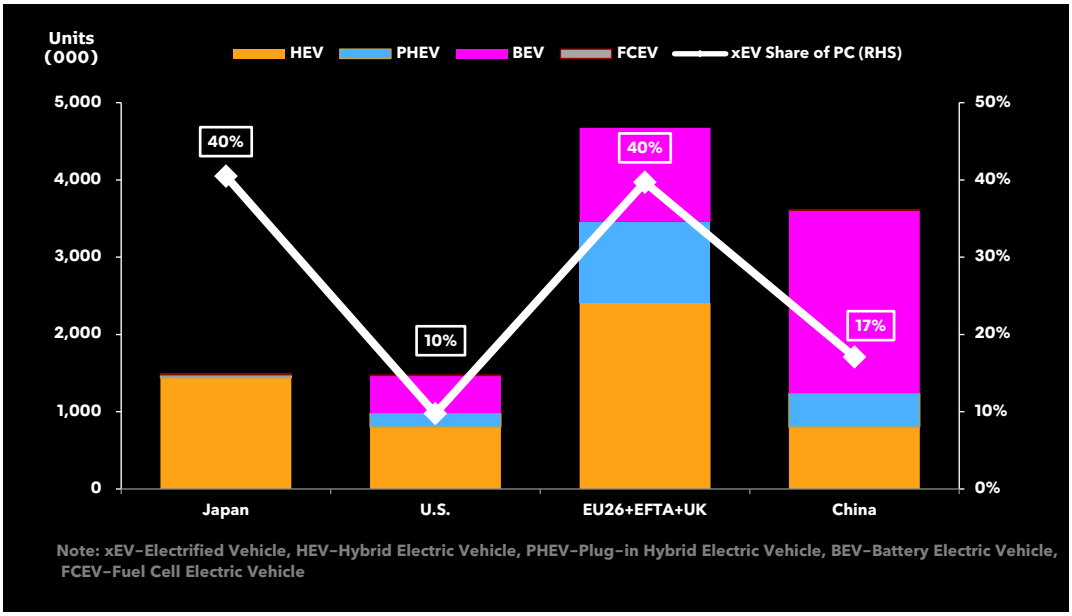
Japanese automakers are crafting their electrified vehicle strategies with comprehensive offerings to meet the requirements of different markets. The industry is poised to accelerate electrification efforts, leveraging expertise gained from hybrids, which now dominate their domestic market, to compete, including in battery electric vehicles.

## Electrified Vehicle Sales Differ by Region

Electrified vehicle (xEV) sales are poised to grow amid the decarbonization trend, but by differing paths depending on local traits. xEVs range from hybrid electric vehicles (HEV) combining an engine with an electric motor to plug-in HEVs (PHEV), whose battery can be charged externally, to battery electric vehicles (BEV) with only electric motors powered by batteries, to fuel cell electric vehicles (FCEV), powered by the electricity generated via the chemical reaction of oxygen with hydrogen in fuel cell stacks.

In Japan, HEVs dominate, while in China, Europe and the U.S. HEVs as well as BEVs and PHEVs are the main electrified vehicles. This is because Japan has no regulations requiring specific types of xEVs, whereas the U.S., Europe, and China have regulations and incentives that directly require specific types of xEVs.

**Electrified Vehicle Sales and Penetration: 2021**



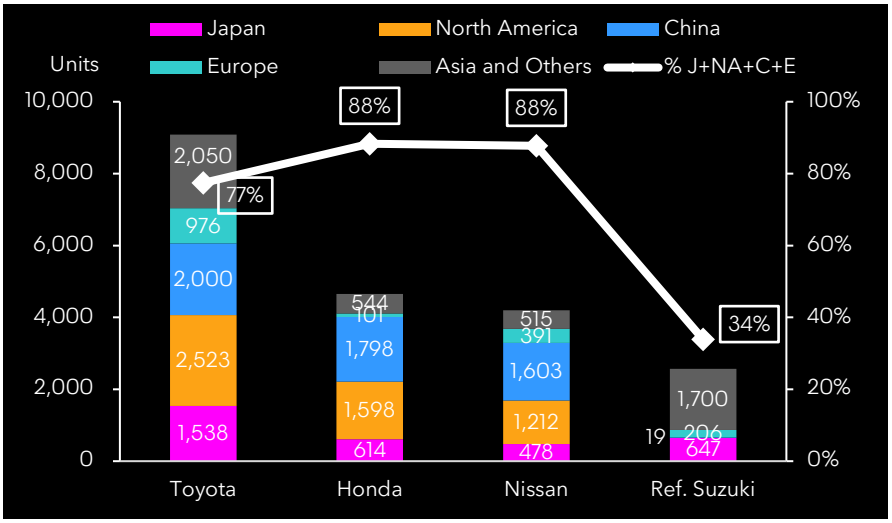

Source: Nikkan Jidosha Shimbun, MarkLines, ACEA, Bloomberg Intelligence

## Japan Automakers to Respond to Local Traits

Introduction of xEVs is essential for Japanese's automakers to continue business in Japan, North America, China and Europe, where the electrification is progressing. We believe Japanese automakers will be flexible in responding to the right type of vehicle in the right place, depending on the regulations, incentives, energy mix and consumer preferences of the regions where they sell their products.

New energy vehicle regulations in China, zero-emission vehicle mandates in the U.S. states adopting California's emission standards and EU CO2 emission regulations require BEVs and PHEVs. In Japan, there are no laws requiring specific types of electric vehicles, but fuel economy standards, tax exemptions, consumer preferences and government decarbonization initiatives are the driving forces behind electrification.

**Japanese Automakers' Sales by Region: FY3/2021**




Source: Company Filings, Bloomberg Intelligence

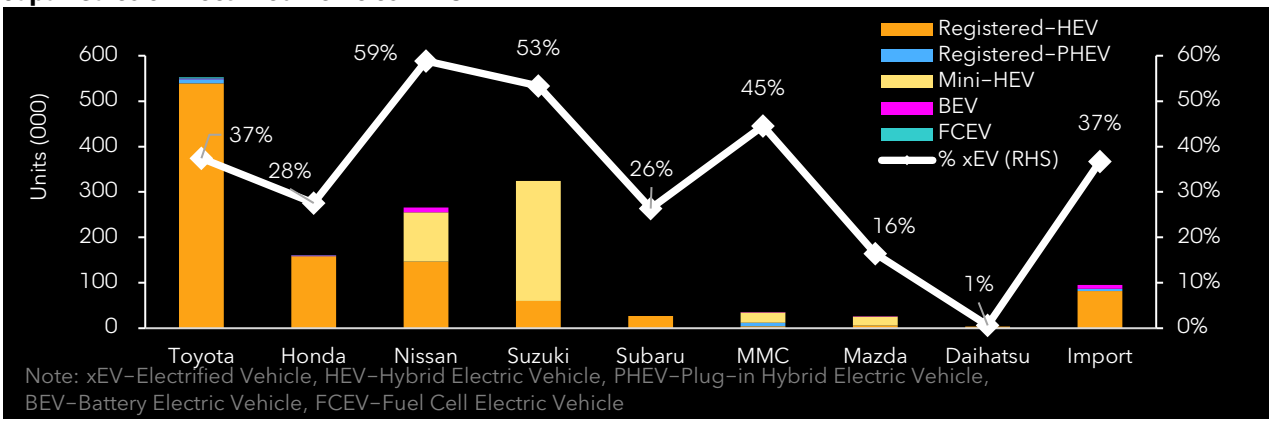
## Japan Accelerating Electrification Push

Japan, for carbon neutrality by 2050, aims for all new vehicles to be electrified with HEVs, PHEVs, BEVs and FCEVs by mid-2030, with Tokyo hitting the milestone in 2030. Japan's auto industry has accumulated a wealth of vehicle electrification technology and production know-how since the late 1990s through hybrids, which make up the majority of Japan's electrified-vehicle market. Japanese automakers and suppliers could effectively apply that expertise to BEVs as well. The sector can refine vehicle-electrification technology before 2030 as there are at least one or two model generation renewals by then.

We believe Japanese automakers can use Tokyo's and the national government's goals as an opportunity to develop technology and reduce costs, bolstering their competitiveness at home and abroad.

**J**

**Japan Sales of Electrified Vehicles in 2021**



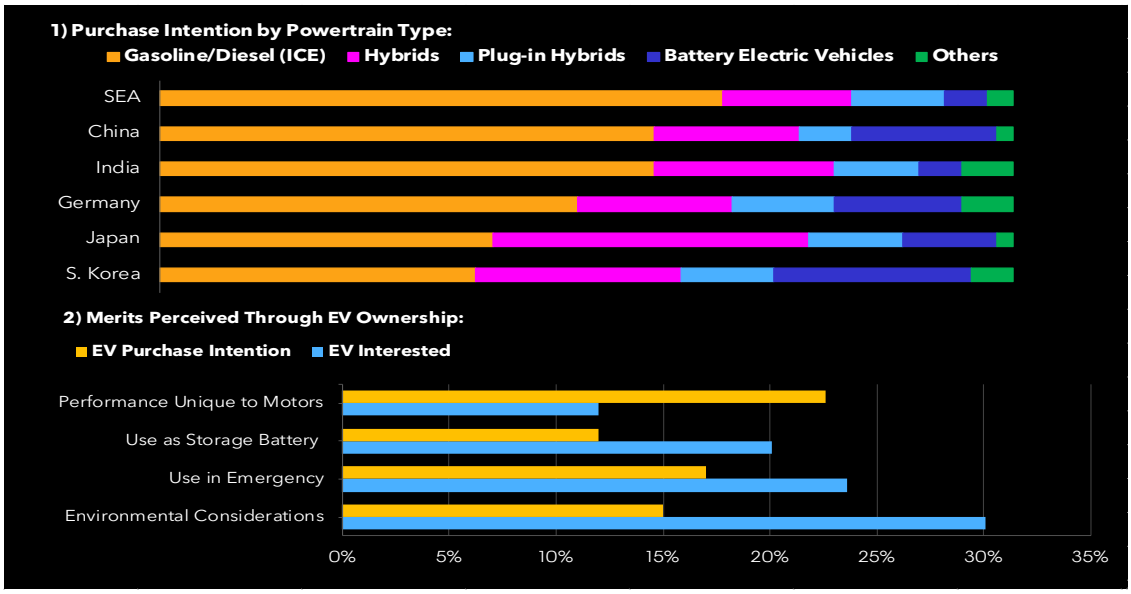

Source: Japan Automobile Dealers Association, Japan Light Motor Vehicle and Motorcycle Association, Nikkan Jidosha Shimbun

## Hybrids - the Best of Both Worlds?

The main barrier to a pure electric shift for Japanese consumers lies in the lack of private charging access and resulting dependence on public infrastructure. For consumers with adequate home charging equipment at their disposal, benefits perceived uniquely from EV ownership become key to adoption, surveys suggest. The main motives for adoption include the driving experience and, to a lesser but increasing extent, peer influence and a sense of pride in ownership.

In contrast, consumers whose interest in EVs doesn't translate to actual purchase intent value environmental benefits and practical aspects, such as the battery's use as an emergency backup power supply. These benefits may be sufficiently satisfied by hybrids without the added hurdle of price tag, resulting in a strong preference for such vehicles in Japan.

**Select Consumer Survey Results**

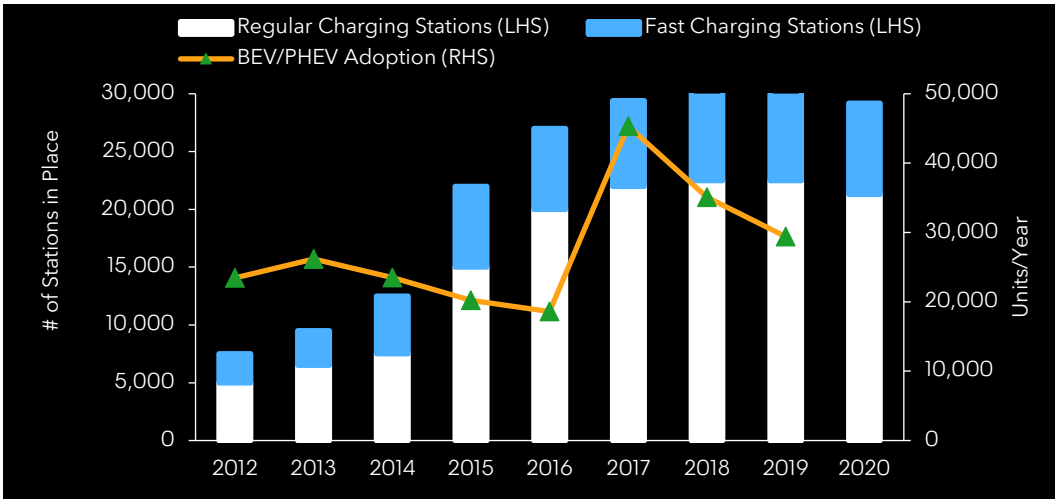



Source: Deloitte Tohmatsu

## Infrastructure Conundrum Aids Hybrid's Grip

If infrastructure efforts aren't aligned with actual BEV/PHEV adoption patterns, purchase incentives may be insufficient to eclipse the hybrid. To spur BEV/PHEV adoption to reach 20-30% by2030, Japan has effectively doubled purchase incentives, and aims to expand the nationwide charging network fivefold. Yet with penetration at just over 1%, many charging stations that have either reached the end of their useful life or are severely underused could be taken out of service. So, in the near term, the unsubsidized hybrid is likely to keep its prominent foothold in the country's road to electrification.

**Japan Charging Infrastructure; BEV/PHEV Adoption**



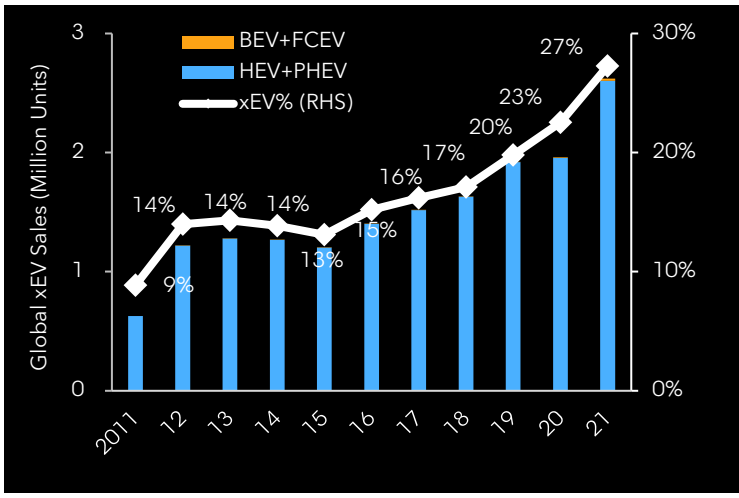

Source: Zenrin Co., Next Generation Vehicle Promotion Center

## Toyota to Accelerate BEV Launch Toward 2030

Toyota is accelerating a BEV and FCEV sales push, particularly in China, Europe and U.S. states applying California regulations. Yet BEVs face challenges including battery costs, range limitations, charging infrastructure, used car prices and reuse of batteries. The automaker will continue to take into account the energy mix, regulations and market characteristics of each country.

Its renewed BEV strategy announced in December 2021 calls for 3.5 million annual unit sales by 2030 with 30 BEV models, a big jump from a May target of 2 million units of BEVs and FCEVs combined. Lexus aims for 1 million units globally with all of its sales in Europe, North America and China as BEVs by 2030 and all of its sales worldwide as BEVs by 2035.

**Toyota: Electrified Vehicle Sales and Target**




| Toyota's BEV Projection | 2030 | 2035 |
|---|---|---|
| **Sales: Million Units** | | |
| Global | 3.5 | --- |
| Toyota | 2.5 | --- |
| Lexus | 1.0 | --- |
| **Lexus Regional BEV Ratio** | | |
| Global | n.a. | 100% |
| NorthAmerica | 100% | 100% |
| Europe | 100% | 100% |
| China | 100% | 100% |

Note
1. Abbreviations
xEV: Electrified Vehicle = HEV + PHEV + BEV + FCEV
HEV: Hybrid Electric Vehicle
PHEV: Plug-in Hybrid Electric Vehicle
BEV: Battery Electric Vehicle
FCEV: Fuel Cell Electric Vehicle
2. xEV% is ratio of electrified vehicles sales

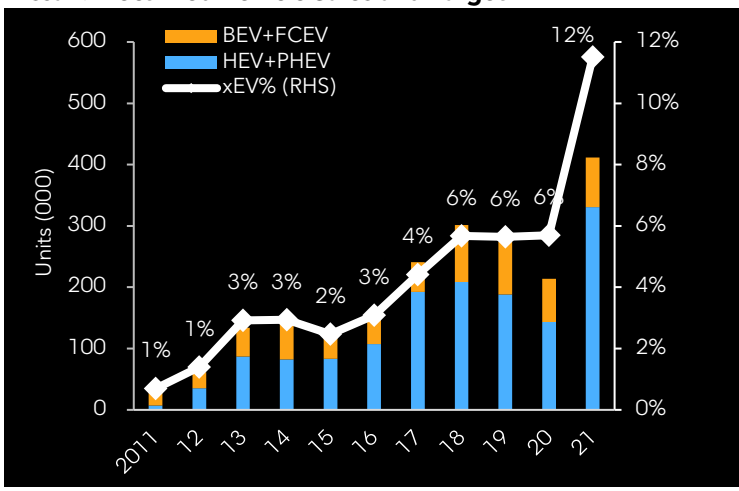
Source: Company Filings, Bloomberg Intelligence

## Nissan Aims to Electrify Half Its Sales by 2030

Nissan is advancing electrification with its proprietary e-Power series-hybrid vehicles and battery electric vehicles. In January 2021, the company set a 2050 carbon-neutrality goal and, in November, revealed its long-term Nissan Ambition 2030, which targets xEVs to make up more than half its global sales by 2030. To achieve this, it will introduce 23 xEV models, including 15 BEV products, by 2030.

The company's e-Power system, which uses electricity generated from a gasoline engine to drive a motor, is used in small and light vehicles in the B and C segments, but we believe Nissan needs to develop a system for larger ones to meet its sales targets. Yet the company may need to review its plans, depending on regulatory trends, as some regions plan to ban internal combustion engines.

**Nissan: Electrified Vehicle Sales and Target**




| Nissan's Target | | |
|---|---|---|
| Region | xEV Ratio | |
| | 2026 | 2030 |
| Japan | 55%+ | --- |
| U.S. | --- | 40% BEV |
| China | 40%+ | --- |
| Europe | 75%+ | --- |
| Global | 40%+ | 50%+ |

Note
1. Abbreviations
xEV: Electrified Vehicle = HEV + PHEV + BEV + FCEV
HEV: Hybrid Electric Vehicle
PHEV: Plug-in Hybrid Electric Vehicle
BEV: Battery Electric Vehicle
FCEV: Fuel Cell Electric Vehicle
2. xEV% is ratio of electrified vehicles sales
3. Micro hybrid is included in 2021, but was excluded until 2020

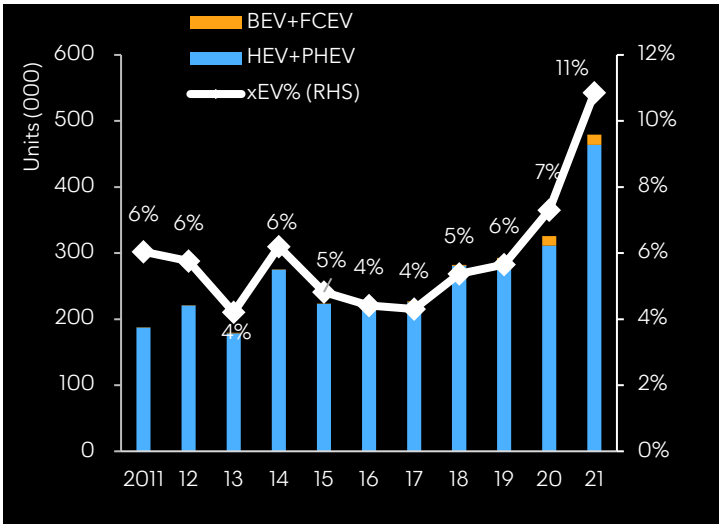
Source: Company, MarkLines, Bloomberg Intelligence

## Auto Sales to Be All Electric by 2040

Honda is set to spur electrification, including hybrid electric vehicles (HEV), plug-in hybrid electric vehicles (PHEV), BEVs and FCEVs. It aims to raise the ratio of BEV and FCEV sales to 40% in North America and China by 2030, 80% by 2035 and 100% globally by 2040. It also plans to launch a mini–BEV in Japan in 2024, but due to a local preference for HEVs, its 100% electrification target in 2030 breaks down as HEV+PHEV: BEV+FCEV at 80:20. It then aims to reverse this to 20:80 by 2035, and targets 100% BEV+FCEV by 2040. In North America, Honda will release BEVs developed with GM starting in 2024. In China, it will launch its own BEVs as well as those with two local joint ventures. In Japan and Europe, it released the Honda e, a compact EV model, in 2020.

An alliance with Sony is expected to amalgamate BEV and mobility services.

**Honda: Electrified Vehicle Sales and Target**




| Honda's Target for BEV/FCEV | | | |
|---|---|---|---|
| Region | 2030 | 2035 | 2040 |
| North America | 40% | 80% | 100% |
| China | 40% | 80% | 100% |
| Japan | 20% | 80% | 100% |
| memo: Japan HEV and PHEV | 80% | 20% | 0% |

Note
1. Abbreviations
xEV: Electrified Vehicle = HEV + PHEV + BEV + FCEV
HEV: Hybrid Electric Vehicle
PHEV: Plug-in Hybrid Electric Vehicle
BEV: Battery Electric Vehicle
FCEV: Fuel Cell Electric Vehicle
2. xEV% is ratio of electrified vehicles sales

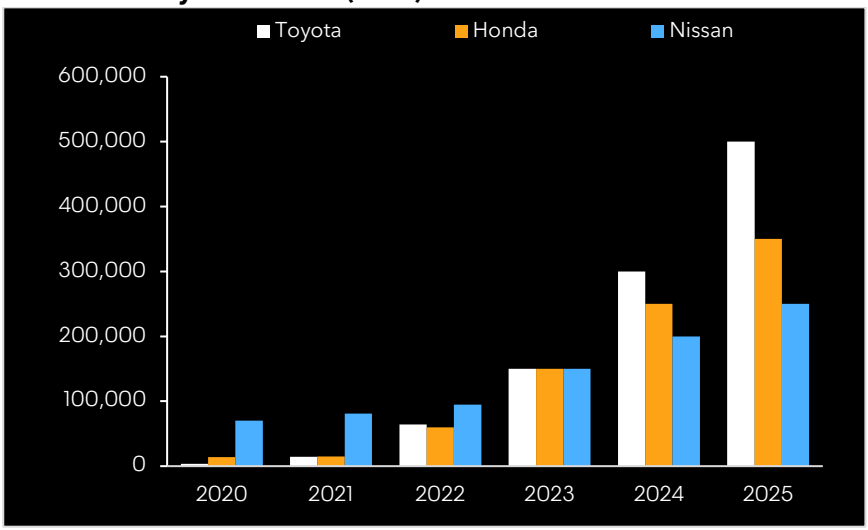
Source: Bloomberg Intelligence

## BEVs May Accelerate From 2026

Japanese automakers' strategies to electrify their vehicles reflect local regulations, incentives, energy mixes and consumer preferences. We believe their focus is shifting gradually from HEVs to BEVs, but that the latter will gain significant momentum only from 2026 onwards.

Toyota Motor aims for annual BEV sales of 3.5 million units by 2030 with the introduction of 30 BEV models. Launches are expected to accelerate in 2026, with production capacity for vehicles and batteries ramping up. Honda plans annual BEV production of 2 million units or more in 2030 after the introduction of a new, dedicated BEV platform, "Honda e: Architecture", in 2026. Nissan's plan calls for combined BEV and HEV sales of 40% of its global sales in 2026, followed by 50%.

**BEV Volumes by Automakers (Units)**



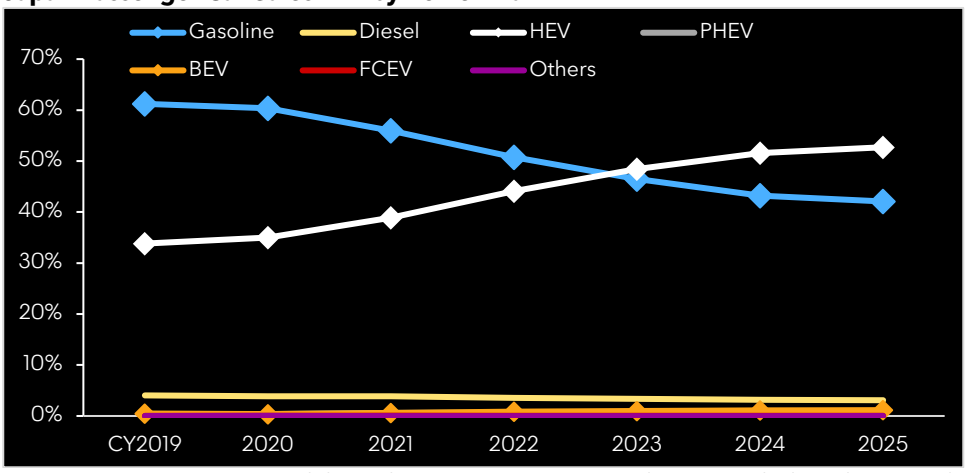

Source: Source: Company Filings, MarkLines, Bloomberg Intelligence

## BEV Mix at 1%; HEVs May Exceed Engine Vehicles

In 2021, Japan's passenger-car sales mix by powertrain was 56% gasoline, 4% diesel, 39% HEV, and1% BEV and others. The share of HEV has been on the rise, but its growth seems restrained by semiconductor shortages since HEV needs more chips than internal combustion engines. We believe the increase in the ratio of HEVs is likely to accelerate as chip shortages ease so that HEVs account for more than half of Japan's passenger-car sales by 2025.

Many new BEVs are being offered in Japan in 2022, including Toyota's bZ4X and RZ, Subaru's Solterra, Nissan's Ariya and Sakura, and Mitsubishi Motors' EK Cross EV, and more debuts of BEVs are expected in 2023-25. However, due to high prices, few charging stations and concerns about short range, the ratio of BEVs will remain at around 1% in Japan for now, we believe.

**Japan Passenger Car-Sales Mix by Power Train**



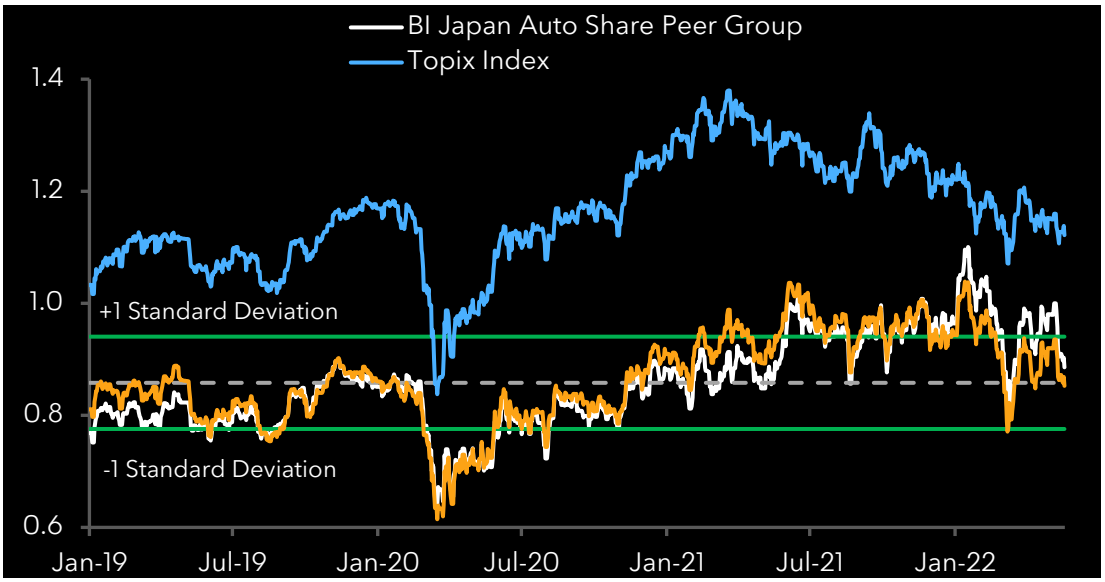

Source: Source: Japan Automobile Dealers Association, Japan Light Motor Vehicle and Motorcycle Association, Nikkan Jidosha Shimbun, Marklines, Bloomberg Intelligence

## Japan Auto Stocks' Valuations to Remain Bumpy

Price-to-book valuations of seven Japanese automakers that we cover may fluctuate, reflecting uncertainties stemming from vehicle-output cuts, rising input prices, foreign exchange and the war in Ukraine. Valuations appear to reflect company fundamentals and macro factors rather than progress with BEV introductions. Valuations, hit by the outbreak of Covid-19, recovered to pre-pandemic levels in 1H21 and exceeded those levels in 2H21, reflecting the end of the worst period of output cuts and the impact of a weak yen.

After a sharp decline due to the war in Ukraine and a subsequent rebound, valuations are currently falling again due to the impact of prolonged parts shortages and higher input costs, though the weak yen continues to provide a tailwind.

**Price-to-Book Valuations of Japanese Automakers**




Source: Bloomberg Intelligence

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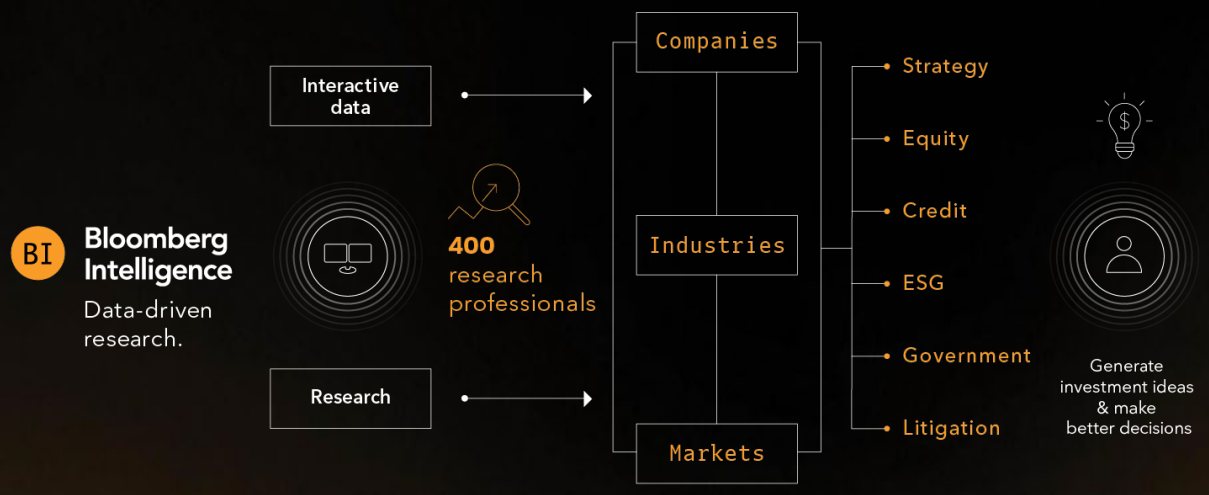

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