



Charging Ahead: Which EV Brands Will Dominate the Next Decade?

A COMPREHENSIVE REPORT COVERING THE PAST, PRESENT,
AND FUTURE OF ELECTRIC VEHICLES BY OEM

By Rick Wainschel
VP, Data Science and Analytics

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New inventions and technologies often follow similar paths. In their infancy, ideas move from concept to prototype. A first mover builds an introductory product that is available to the public but does not have the capacity, ingenuity, or organizational skills to do so at scale. Other entities, seeing the promise of this capability, jump into the fray and build out evolutions of the original design. A shakeout period ensues, a dominant company (or two or three) emerges and overtakes the market. And finally, a handful of additional players carve out a viable piece of the pie by creating variations that appeal to consumers seeking specific features or functions.

The smartphone market is an excellent example of this trajectory. Chances are very good that the smartphone in anyone's pocket is either an iPhone (55% of U.S. sales in Q2 2023) or a Samsung Galaxy (23%). Lenovo/Motorola (9%), Google Pixel (3%), and a group of other niche players (10%) account for the rest.¹ But the playing field did not always look the way it does today.

The first smartphone was invented by an IBM engineer named Frank Canova in 1992. Two years later, a commercialized version of Canova's prototype—the IBM Simon, which had capabilities such as a calendar, calculator, and address book—hit the market and sold 50,000 units in its first six months. Over the ensuing decade, an assortment of innovations—games, cameras, 3G network, GPS, and much more—were developed by a wider array of companies such as Kyocera, Sharp, Ericsson, and Qualcomm. But it wasn't until 2007, when Apple brought a number of these innovations together into one product (and backed by a hugely innovative operating system) that the smartphones that we now know and love came into being. And when the first Android smartphone was introduced one year later, the marketplace as we know it today was off and running.²

The early days of the automotive industry followed a similar path. The Duryea Motor Wagon Company, formed in 1893, was the first entity to mass-produce automobiles in the United States—fourteen years after George Selden filed for a patent for the horseless carriage. Eventually, a handful of leaders emerged—including brands such as Ford, Mercedes-Benz, Cadillac, and Chrysler that have thrived (or survived) to the present day—while leaving others such as Maryland Steamer, Pilgrim Motor Car Company, and the ironically named Apple Automobile Company in the dust. While the current industry seems stable from year to year or even decade to decade, the current landscape has left prominent and, in some cases, long-standing brands such as Pontiac, Mercury, Isuzu, and Scion, behind. Oldsmobile—one of the original makes from the industry’s earliest days—ceased to be a brand after 100 years in operation.

While history, brand equity, infrastructure scale and scope, and reputation propel a brand forward and lead to short and medium-term success and profitability, long-term success is not preordained or guaranteed. Particularly in times of crisis or at innovation inflection points, the automotive industry has proven this to be true time and again. And the latest inflection point—the transformation from a gas-powered internal combustion engine (ICE) oriented world to one dominated by electric vehicles (EV)—may very well lead to the next big shakeout of winners and losers over the next decade.

A New Era of Automotive Invention and Innovation

In April 2023, the Biden Administration announced aggressive federal standards to avoid almost 10 billion tons of CO2 emissions and reduce oil imports by 20 billion barrels by 2055. Overall, the Environmental Protection Agency (EPA) estimates that the benefits of these standards will exceed their costs by \$1 trillion. To achieve these objectives and “depending on the compliance paths selected to meet these standards,” the EPA estimates that electric vehicles will need to account for 67% of new light-duty and 46% of new medium-duty vehicle sales in the model year 2032—a send-a-man-to-the-moon undertaking over the next eight years.

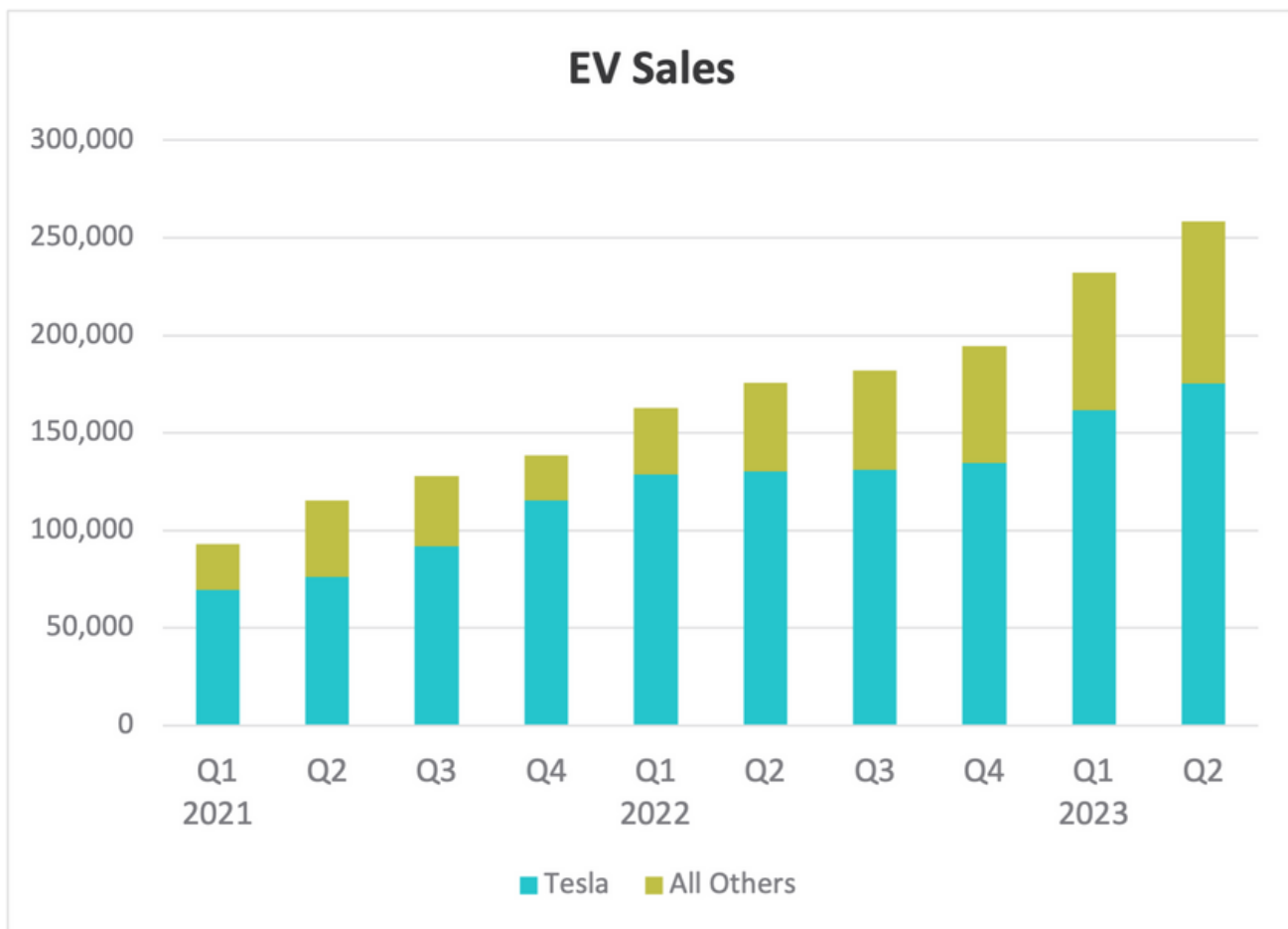
These standards have already begun and will continue to force the auto industry into a new era of invention and innovation. It is not hyperbole to say that we are in the infancy stages of the next revolution, and it is unclear how we get from the current state to the future state or who will thrive or survive when we get there. There is already one emergent winner in Tesla (at least so far), but the other key players have yet to be determined. Past success, partnerships, profitability, production infrastructure, name recognition, and brand equity will all play a role in writing this next chapter, but the outcomes for existing and emerging companies are far from preordained.

This report appraises the current state of the electric vehicle marketplace from a supply and demand perspective and evaluates which companies are best positioned to succeed in the coming years as we transition from an ICE-dominant vehicle fleet to this brave new world of EVs.

The Bigger Picture – Vehicle Sales/Movement Q1 2021-Q2 2023

Before getting into each specific company’s current and future prospects, it is important to look at the bigger picture of EVs in the context of other fuel types.

In Q2 2023, estimated overall EV sales increased by 11.2% compared to the prior quarter and by 47.0% compared to the prior year. According to sales figures from Cox Automotive and Vehicle Movement data from [Cloud Theory](#), Tesla accounts for 67.9% of the total—down from 69.6% in the prior quarter and 74.0% in the prior year.



While EV sales have been growing, gas-powered vehicles are still king in the larger context. They accounted for 79.0% of new vehicle sales in Q2 2023—down 1.6 points quarter-over-quarter (QoQ) and 3.7 points year-over-year (YoY), but still dominant. It is also noted that about two-thirds of that YoY share decline for gas vehicles went towards hybrid vehicles and only one-third towards EVs.

Vehicle Sales/Movement by Fuel Type

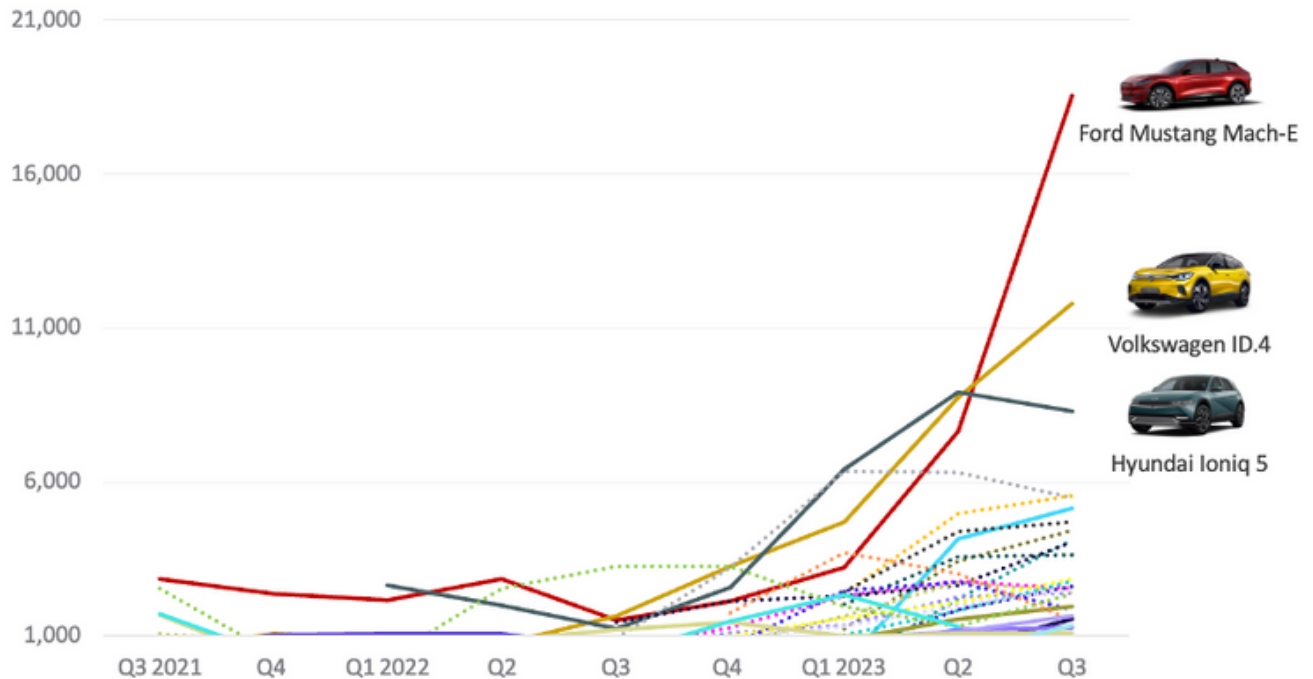


	% Change – Sales/Movement		Share		
	Q2 2023 vs. Prior Quarter	Q2 2023 vs. Prior Year	Q2	Vs. Prior Quarter	Vs. Prior Year
Gas	+10.7%	+17.5%	79.0%	-1.6 points	-3.7 points
Hybrid	+34.6%	+64.9%	9.4%	+1.5 points	+2.4 points
Electric	+11.2%	+47.0%	7.9%	-0.1 points	+1.3 points
Alt Fuel	+39.0%	+17.9%	2.1%	+0.4 points	-0.1 points
Diesel	-0.7%	+33.2%	1.5%	-0.3 points	+0.1 points

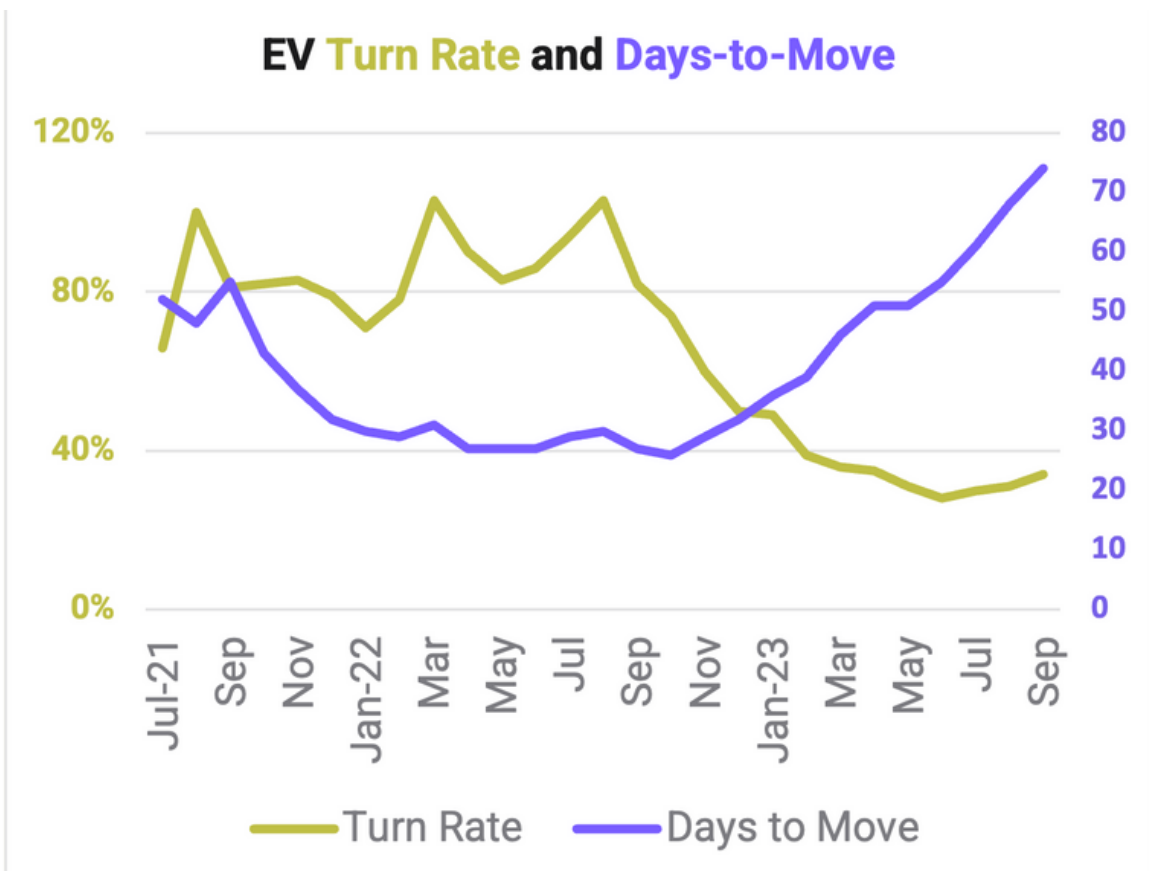
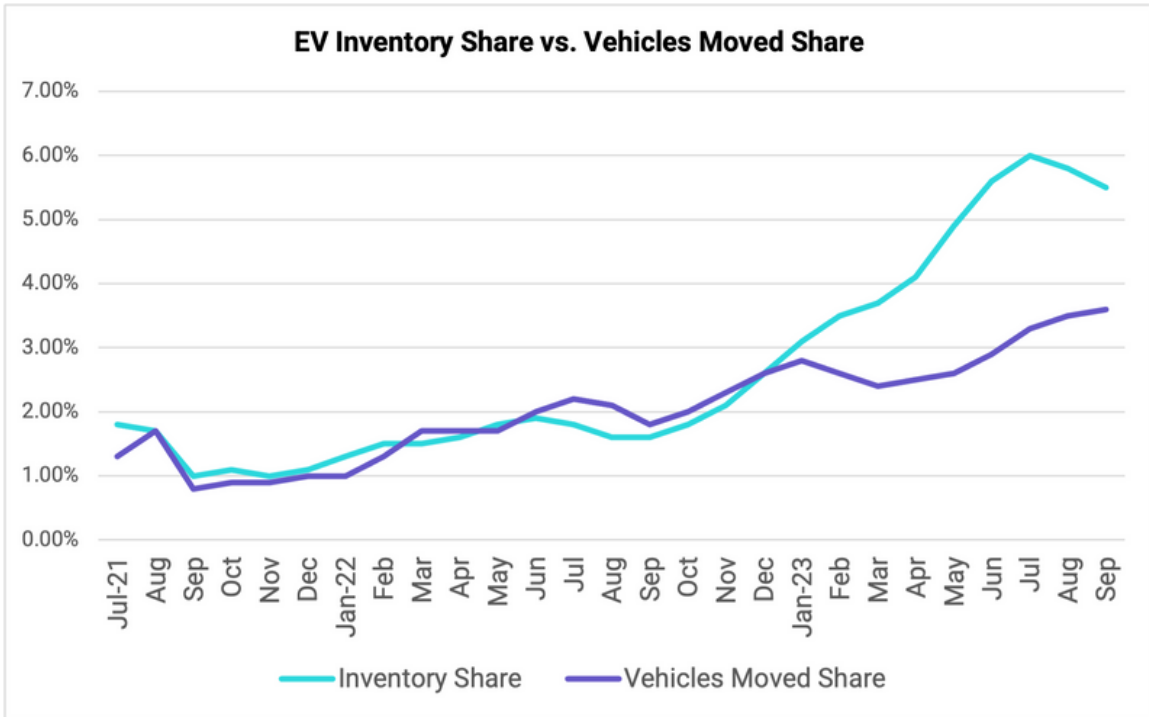
It is clear that Tesla is currently the 800-pound gorilla in the EV space. Its battery technology, charging infrastructure, and design work are just some of the advantages Tesla has enjoyed during its early stages of invention and innovation. It is not a big stretch to assume that Tesla will remain one of the leaders in this space over the next decade. But even with such a dominant share currently, the overall EV marketplace is still in its infancy, and the competitive die has not been cast. To get anywhere close to the EPA standard-driven targets in 2032, the entire automotive landscape – Tesla included—is going to have to change. But let's set Tesla aside for a moment and look at how the rest of the automotive industry is faring in this space.

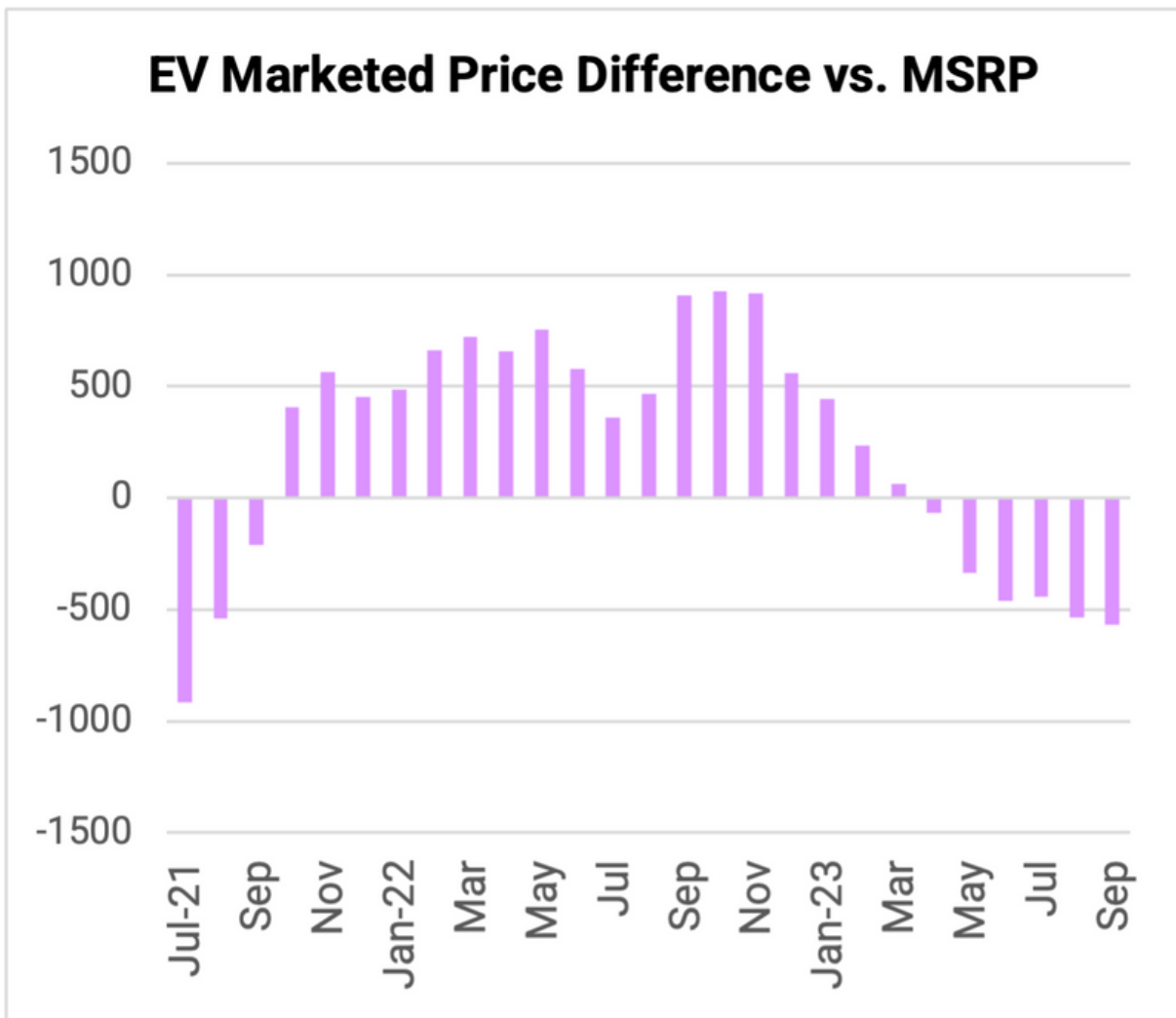
In anticipation of the new EPA standards, OEMs have been aggressively introducing new EV models and ramping up production of existing ones. To put this recent shift into perspective, the number of EVs with average inventories of 1,000 or more ranged between two and six from Q3 2021 to Q3 2022. That number moved up significantly starting in Q4 2022—with 27 hitting that mark in Q3 2023—reflecting the numerous new introductions over the past year. Additionally, inventory levels for existing EV models have increased substantially, led by the Ford Mustang Mach-E, Volkswagen ID.4, and Hyundai Ioniq 5, which are up 1,143%, 616%, and 580% respectively, compared to a year ago.

EVs With Average Inventory of 1,000+



As these new introductions have been coming into the market, the demand side of the equation is not keeping pace with this increase in supply. Among non-Tesla competitors, Inventory Share has separated itself from Vehicles Moved Share since the beginning of 2023, with the former almost double that of the latter. Meanwhile, Turn Rates for EVs have declined, Days-to-Move have increased, and price premiums above MSRP have reversed over the same timeframe. Steve Greenfield, General Partner of Automotive Ventures, citing sales numbers showing Tesla outselling all other U.S. EVs combined, stated “Tesla is pushing most of the legacy automakers into unprofitable, low volume niches.”





At least in the short term, therefore, the environment in which the EV expansion is taking place is a challenging one. A recent poll by The Associated Press-NORC Center for Public Affairs Research indicated that only 19% of adults in the U.S. said they would be extremely or very likely to buy an electric vehicle the next time they are in the market, and 47% said they are not likely to do so. High prices and a lack of charging stations were some of the key reasons for that sentiment.³ Even market leader Tesla is dropping its prices – partly to be more in line with consumer demand and partly to qualify for government tax credits included in the Inflation Reduction Act.⁴

But the long-term answer to this dynamic cannot be to just discount prices, even though that is the short-term stopgap that has been playing out thus far. With auto manufacturers generally losing money on almost every EV they sell, squeezing margins further is a non-starter strategy. Instead, the industry—in concert with federal, state, and local governments—needs to continue to innovate, build out the necessary infrastructure, and overcome consumer resistance. The industry should not underestimate the scope and challenge of this transformation; it will take a concentrated focus and scope of effort akin to the Apollo moon landing or the Manhattan Project. The steps will need to include (but not be limited to) such undertakings as:

- Improving battery capacity to provide peace of mind and extend driving range
- Building out infrastructure to make recharging as accessible, fast, and convenient as stopping at a gas station.
- Creating charging equipment standards (or adaptors) universally suitable for all makes and models.
- Innovating to make home charging more accessible and affordable.
- Overcoming consumer reluctance on these issues via marketing and social media to tout the advancements of these vehicles and their benefits to our society and the environment.
- Overcoming entrenched business interests from groups like oil companies and creating and subsidizing new industries and economies to replace them.
- Navigating resource access (e.g., lithium for batteries) and what could be geopolitical and regulatory implications to ensure manufacturing viability and affordable outcomes for consumers.

With all that said, EV affordability will be a bridge that the industry will need to cross. With an average marketed price of \$66,308 YTD in 2023 (vs. an average of \$50,287 for non-electric vehicles), appealing to mainstream buyers will require that manufacturing scale—and the efficiencies that come with it—bring this sector into a lower and more accessible range. The current price pain that consumers are currently feeling at the fuel pump will help balance the equation to some degree, but the average buyer will still need to see cost reductions to land these vehicles into an acceptable range.

Who Will Lead The EV Race in the Next Decade?

The honest answer is that nobody really knows.

Sure, Tesla is in the strongest position currently, but by no means invulnerable. Issues such as production capacity, overreliance on Elon Musk's company representation, challenges from Chinese companies, and a shortage of batteries⁵ could complicate and compromise Tesla's marketplace dominance. Other factors, such as a strategic avoidance of dealerships may limit its ability to efficiently and economically service vehicles for more mainstream buyers. For now, however, it is the one company that all other contenders cannot ignore or avoid. Its market capitalization is bigger than that of Toyota, General Motors, Ford, Stellantis, Volkswagen Group, and BMW combined. So, let's assume that a leadership slot in the EV space ten years from now is Tesla's to lose and turn our attention to who is best positioned to join the EV leadership ranks.

The next honest answer is that the EV leadership future is very much up for grabs, with no company currently holding a commanding position as a leading contender. This is not to disparage the efforts and energy that companies such as Ford, Hyundai, GM, BMW, and others have put into this space; it is merely a reflection of the infancy stage that this sector of the industry is in—both in terms of manufacturing focus and consumer adoption.

Note that this transition period is a point-of-no-return moment in the history of the industry. Many OEMs are planning to completely transform their organizations in taking on this challenge, investing billions of dollars on new technology development, new manufacturing facilities and production lines, battery innovation, recharging infrastructure, and advertising. There will be no turning back, and it is not a given that all players that are at the trailhead today will get to the end destination.

With all of that in mind, however, let's examine the leading contenders that are in or are entering into the EV space.

The BMW Group currently has two EVs with average inventories of 1,000 or more in 2023. It has recently unveiled its Neue Klasse (New Class) concept car—which will act as its EV platform, with production starting in 2025 – but there is a general sentiment that it is playing a bit of catch-up to other existing OEMs and new entrants.⁷

BMW CEO Oliver Zipse has set a goal of 15% of global sales coming from battery powered EVs in 2023. In the U.S. through September, its vehicle movement percentage sits at 13.0% (28,635 EVs moved)—not far from that target.

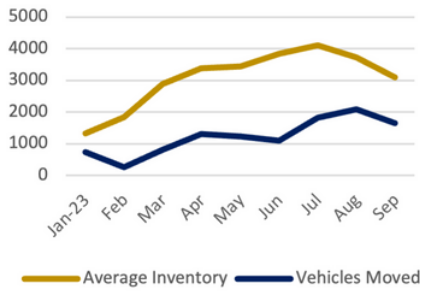
BMW's lower-priced i4 model has a relatively strong and relatively steady turn rate, and its marketed price has been rebounding from declines in the Spring. Meanwhile, its higher-priced iX model has seen some recent resilience in turn rate (though not to the level of its sister model) with a very steady marketed price right around \$100K.

Summary

The BMW Group has established a foothold in the EV space to-date, with slightly more than one out of 8 vehicles moved coming from that segment. It is close to hitting its close-in EV percentage goal and is preparing to ramp up production in the next two years. Transitioning its mainstream models to the “New Class” technology in the future will be the key to whether it can be a major player in this space.

BMW Group

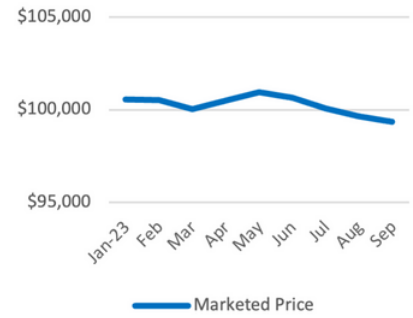
BMW iX **Inventory** and Vehicles Moved



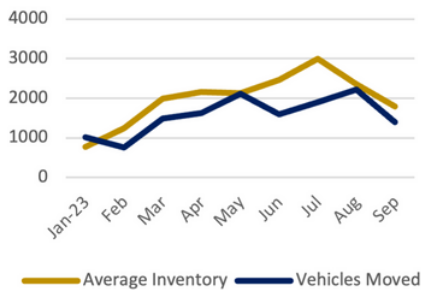
BMW iX **Turn Rate**



BMW iX **Marketed Price**



BMW i4 **Inventory** and Vehicles Moved



BMW i4 **Turn Rate**



BMW i4 **Marketed Price**

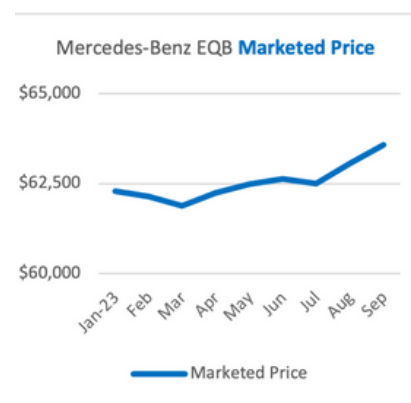
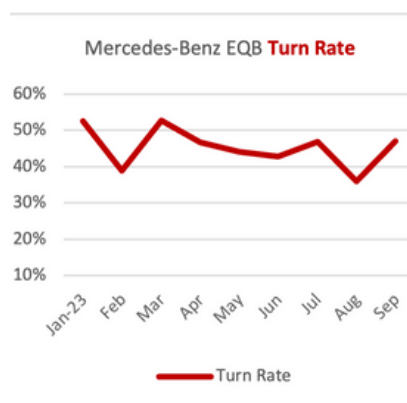
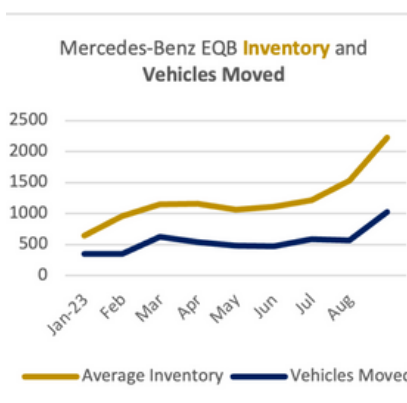
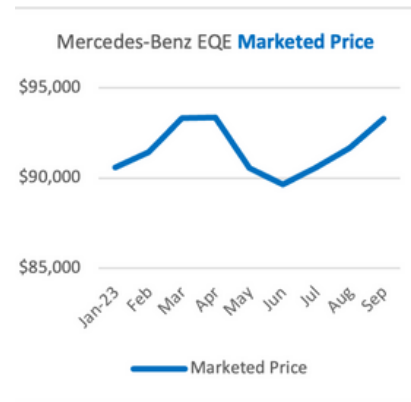
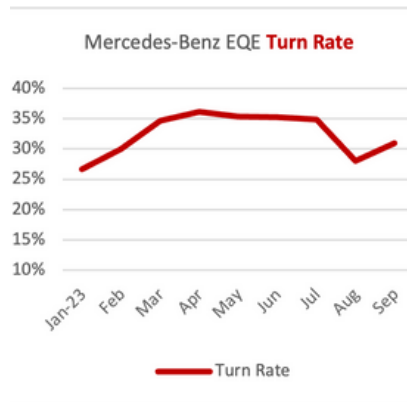
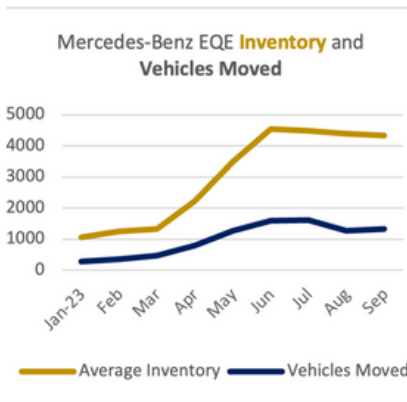
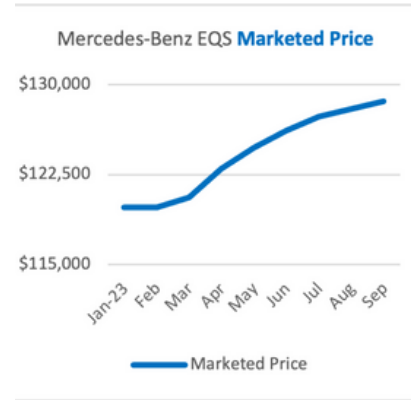
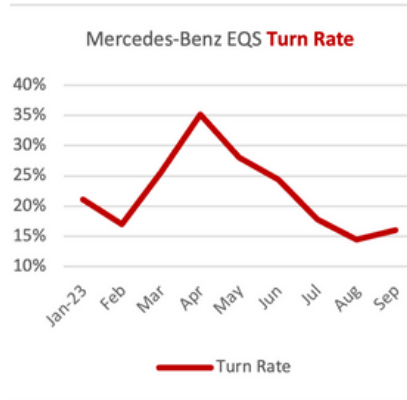
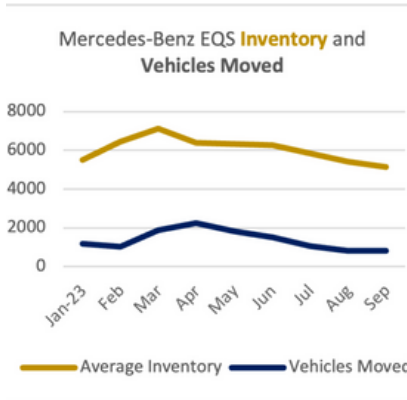


Mercedes-Benz has signaled that it is 'close-to-production' on a set of vehicles that will extend driving range beyond that of Tesla's leading vehicles, though it has not specified a launch date as of yet.⁸ Its YTD vehicle movement through September is 26,319 (12.6% of total)—similar to the level of the BMW Group.

As for its current EV lineup, Mercedes has three models that have average inventory levels of 1,000+ in 2023. There is a relatively wide gap between inventory and vehicle movement for all three models, with turn rates therefore coming under some pressure. Pricing has shown upward momentum, however.

Summary

Like its German rival BMW (and other OEMs), Daimler AG is currently focused on setting up its future by planning for its next-generation technology. If its innovation truly does outstrip Tesla in terms of range, it may position Daimler for future success. While its EV percentage of total brand movement is on the higher end of the range, its relatively low turn rate is an indication that demand is not currently meeting supply.



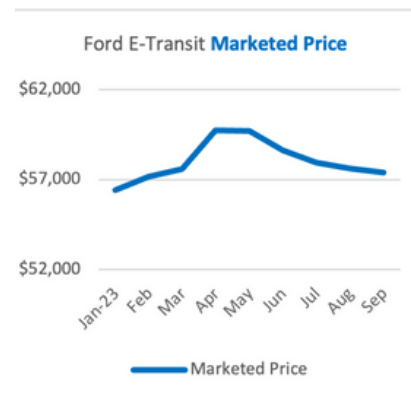
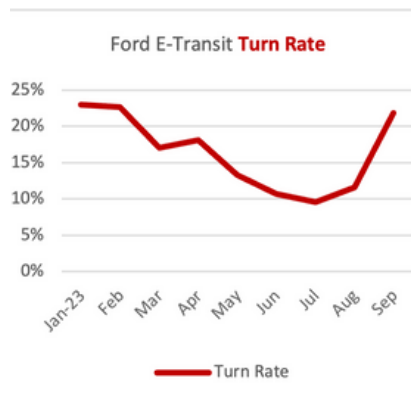
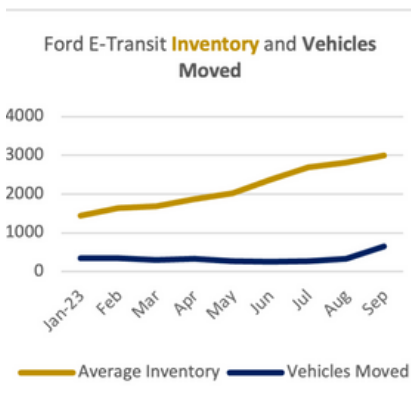
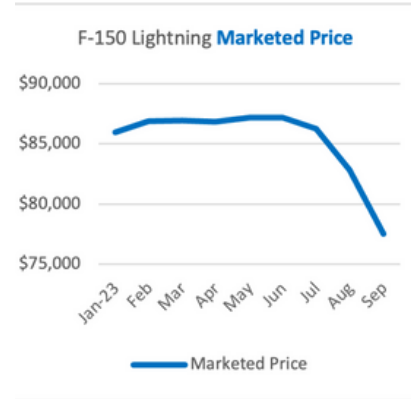
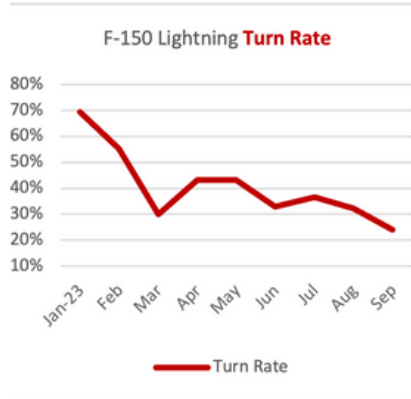
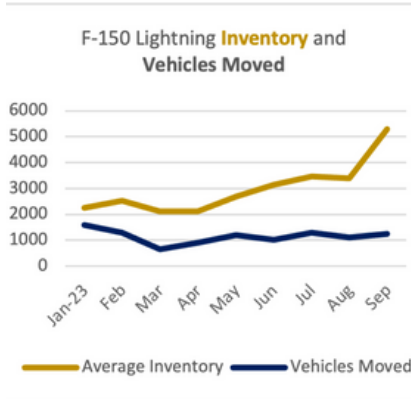
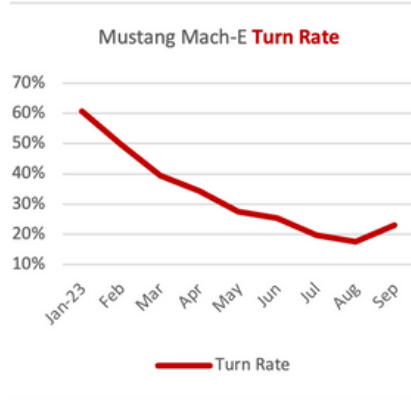
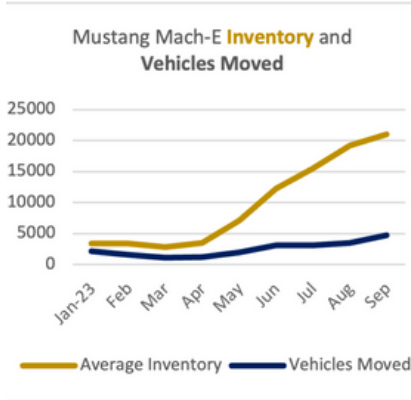
Jim Farley, the CEO of Ford, has recently and repeatedly reiterated Ford's commitment to electric vehicles, despite losing money on each unit sold and racking up a \$1B loss in Q2 2023 alone.⁹ Although Ford recently delayed its goal of selling 600,000 EVs a year by the end of 2023 due to engineering concerns, it remains focused on being a leader in this space because, according to Farley, "The first people who buy our first-generation electrics are going to be the first people to buy our second-generation electrics."⁹

Ford has gone so far as to create a whole new business unit—Model e—with profits from its original business unit funding innovation within it. Farley sees this as the future of Ford, with EVs—no pun intended—fueling growth. "Fifty percent of Lightning customers are new to us. 60% in [Mustang] Mach-E," Farley said. "We're getting customers we've never seen before. And that's very attractive for a company. You're either growing or shrinking ... we want to be a growing company."⁹

While Ford has the capability and mindset to take on a much bigger role in the EV space, its current foundation is only in the beginning stages of maturity. In Ford's portfolio of EVs, just three have 2023 average inventory levels of 1,000 or more. Year-to-date, it has moved 36,008 units —3.4% of its total and far short of its stated goal of hitting a reduced 400,000 mark in 2023. Its two leading EVs, the Mustang Mach-E and the F-150 Lightning, make up 91% of that vehicle movement (with the E-Transit making up the remainder).

In the case of Mach-E, recent signals are that production and inventory have ramped up, but movement has not kept pace. As a result, turn rates and marketed prices have both dropped. The F-150 Lightning has followed a similar trajectory, though its trends are more recent.

Ford



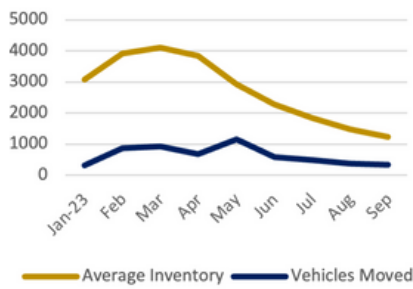
As summarized in “The China Factor” section of this report below, companies from that country are already having an impact on the present state of EVs in the U.S. Geely’s purchase of the Volvo brand from Ford Motor Company in 2010 set the stage for what is likely to be a vastly greater role of Chinese involvement in the EV space in the future.

In the current state, Volvo’s offerings are limited in scope, with just two EV models having average inventory counts of 1,000 or more in 2023. But—similar to BMW Group and Daimler—those vehicles have accounted for 12.2% of vehicle movement (10,870 units) so far this year. While that is true, turn rates for the two models are low—generally in the 25-30% range, though lower in some months—and pricing has come under some pressure, indicating that demand is not keeping pace with current supply.

Summary

In its current state, Geely’s presence in the EV market is small in scope and not likely to play a significant leadership role. When considered as part of a broader Chinese push into the U.S. market, however, it may have more power if it pursues alliances or further acquisitions that increase its position in the marketplace.

Volvo C40 **Inventory** and Vehicles Moved



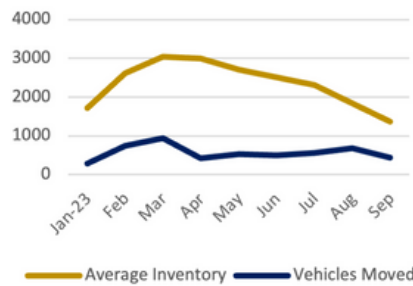
Volvo C40 **Turn Rate**



Volvo C40 **Marketed Price**



Volvo XC40 **Inventory** and Vehicles Moved



Volvo XC40 **Turn Rate**



Volvo XC40 **Marketed Price**



In early 2021, General Motors declared an “aspiration” to end production of gasoline-powered vehicles and transition to a 100% EV fleet by 2035. This announcement came one day after President Biden had signed a series of executive orders prioritizing climate change initiatives.¹⁰

The ensuing two-and-a-half years have done little to temper these aspirations. In a July interview with Forbes Magazine, CEO Mary Barra reiterated GM’s pledge to move to a completely electric fleet in the next 12 years. “...When we looked at our plans and we looked at the regulatory environment, we thought the right thing to do was to get our entire portfolio from a light duty perspective to be all electric by 2035. That was a big statement. But when we did it, we mainly did it because we needed to get everybody internally in the company to stop debating when and start working on how to make sure we get it done,” Barra said.¹¹

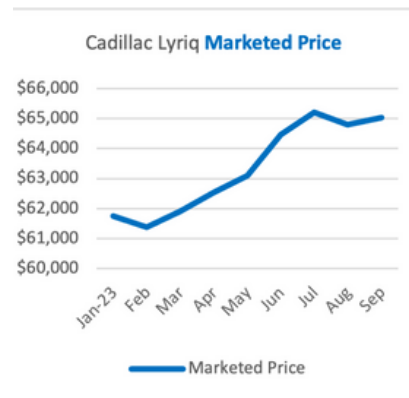
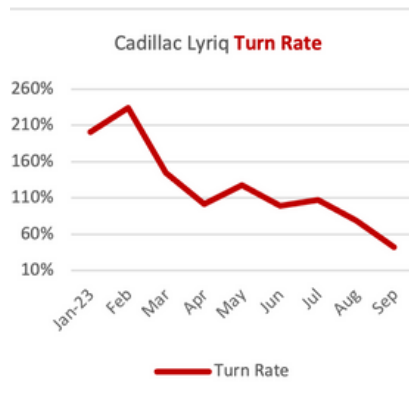
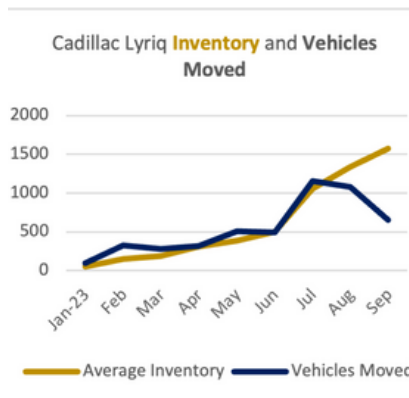
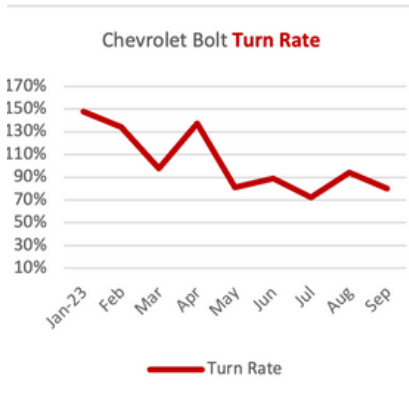
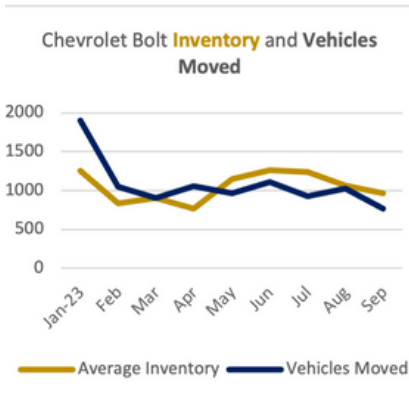
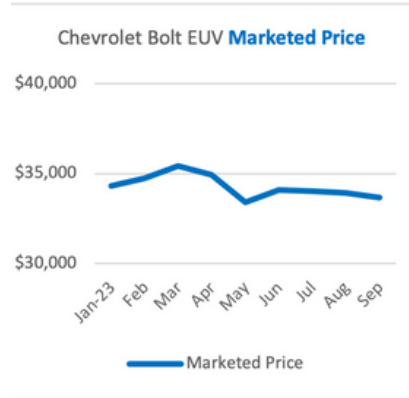
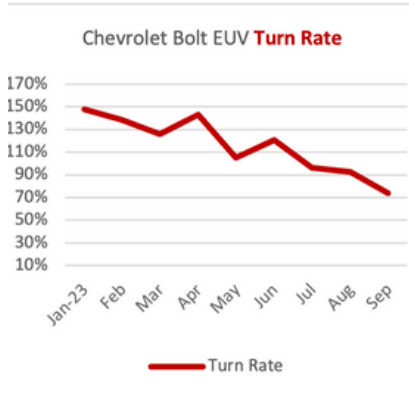
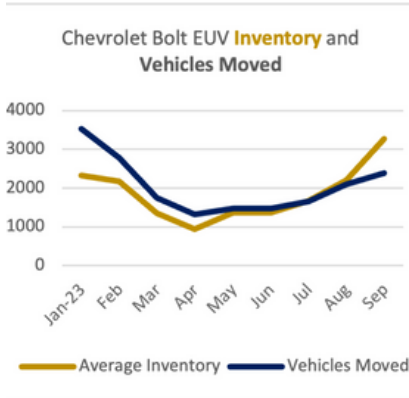
General Motors is pursuing a variety of steps beyond just producing more EVs, including partnerships to build 2,000 charging stations at intervals along major transportation corridors. Additionally, GM is partnering with Tesla to install its charging ports on GM vehicles (following Ford’s similar action), thereby moving toward a more universal solution and substantially increasing consumer access to battery replenishment options.

Like Ford, GM currently has a limited portfolio—just three EVs that currently have inventory levels of 1,000 or more, and vehicle movement in 2023 through September is 34,938 (2.2% of its total). In the case of all GM EV models, their turn rates have dropped, with Cadillac Lyriq falling sharply in the past six months. Bolt EUV’s marketed price has held relatively steady throughout 2023, while Bolt and Lyriq pricing has gone up.

Summary

General Motors has ambitions to completely transform the company and its CEO has drawn a 2035 line in the sand to get there. She has indicated that 2025 will be a key inflection point on its journey to go fully electric a decade later. The current lineup –like Ford’s –is limited in breadth and lacking in significant sales volume and turn rates have been coming under pressure in 2023. Getting to its 100% goal from its current low percentage will be a monumental undertaking to build on the early-stage foothold that has been established thus far.

General Motors



With six vehicles at inventory levels above 1,000 in 2023, the Hyundai Motor Group has one of the more established EV lineups among current competitors. Its vehicle movement total through September of 51,640 (4.7% of its total) is behind only Tesla.

While the Inflation Reduction Act has currently made the \$7,500 governmental tax credit unavailable to Hyundai, Kia, and Genesis EV buyers, the company is accelerating the building of a new plant in Georgia that will allow the company to qualify for the incentive. The fast-tracked timeline earmarks the plant to be opened in late 2024. Hyundai plans to build 300,000 EVs annually at the plant going forward.¹²

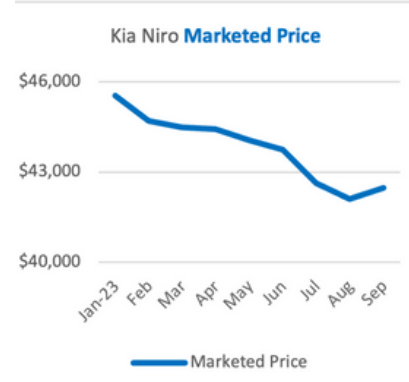
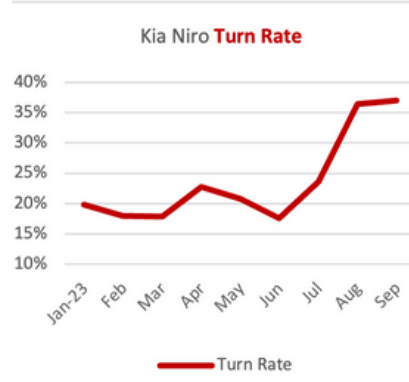
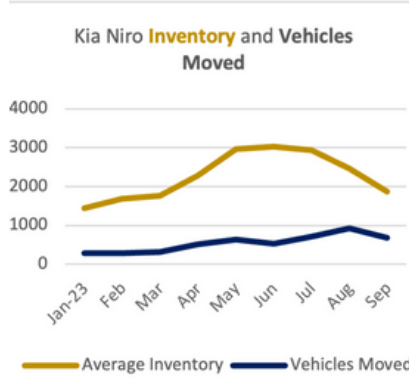
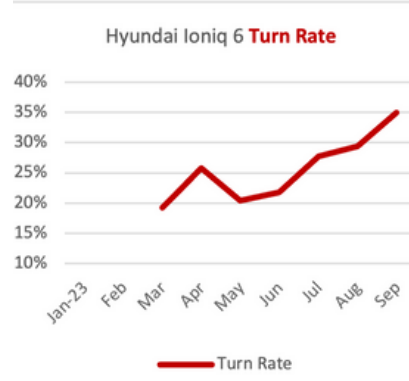
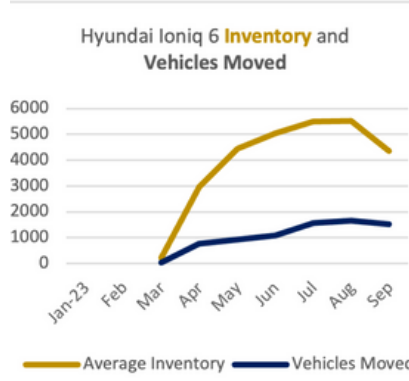
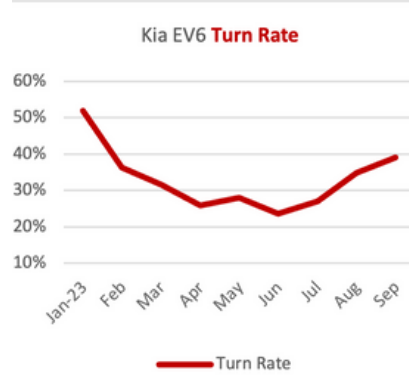
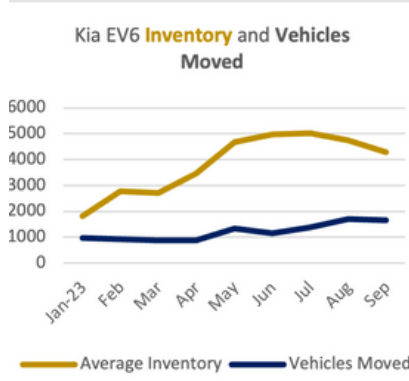
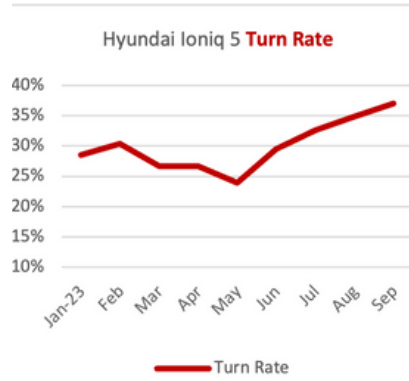
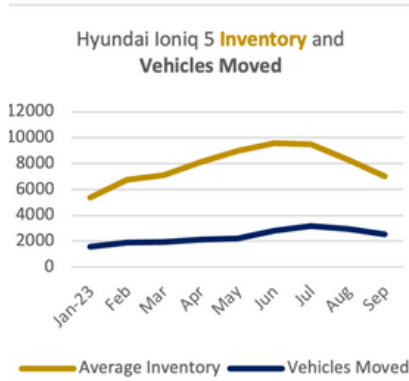
Although Hyundai has signaled its commitment to EVs in general, its path and approach are somewhat dissimilar from Ford and GM's alliance with Tesla to make charging more universally consistent. As an example, it is working with researchers at Georgia Tech University on hydrogen fuel cells (versus battery power) that convert to electric power, and is piloting the creation of hydrogen fueling stations in limited geographies. It is exploring this technology for heavy duty trucks and long-distance vehicles, compared with battery powered EVs for passenger cars and light trucks.¹²

In terms of its EV model portfolio, Hyundai Motor Group's current offerings have low turn rates—generally in the 25-35% range, indicating that they have supply that is outstripping demand—though several have seen upticks in the most recent months. Price declines on five of their six top models are another sign that there is demand pressure on its current EV portfolio.

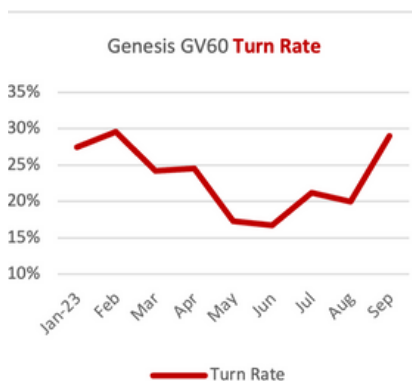
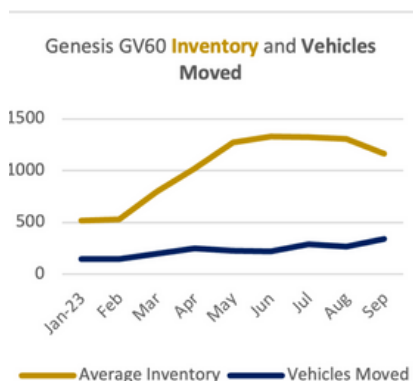
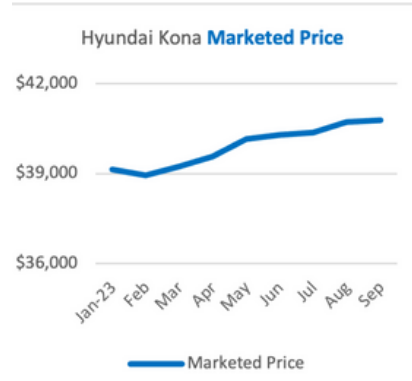
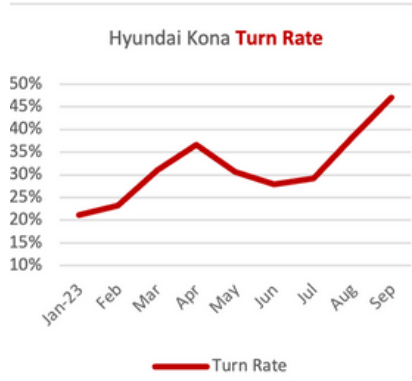
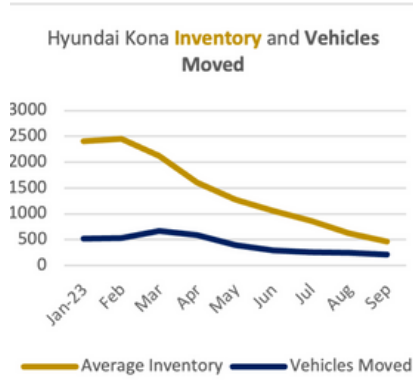
Summary

Hyundai Motor Group's current EV lineup has relative breadth compared to other OEMs, and its vehicle movement is outpacing all other contenders to Tesla's leadership. At the same time, it is not selling its vehicles efficiently and its current selling rate is far from its upcoming production capacity once its Georgia plant comes online. It has not fully shifted its corporate philosophy toward battery powered EVs the way that GM and Ford have, which may either open a competitive advantage or leave it behind as the industry consolidates behind a more consistent recharging approach.

Hyundai Motor Group



Hyundai Motor Group



Renault-Nissan-Mitsubishi Alliance

Across the industry, there are multiple alliances forming to address the EV opportunities and overcome its challenges. Nissan's recent \$663M investment in Renault's EV operation—Ampere—is a prime example of those growing interrelationships.¹³

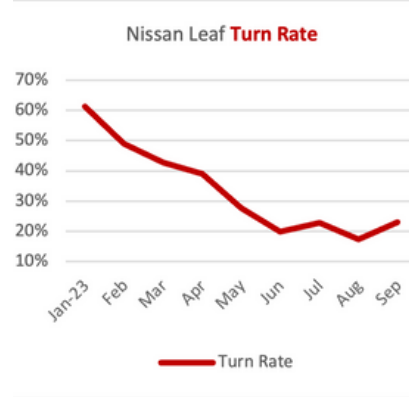
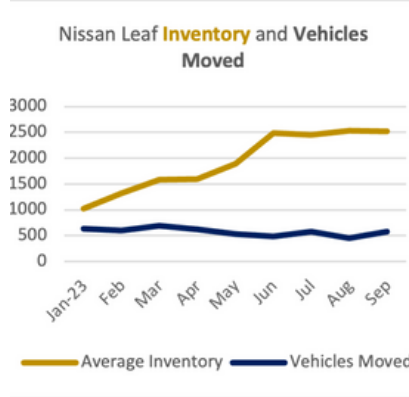
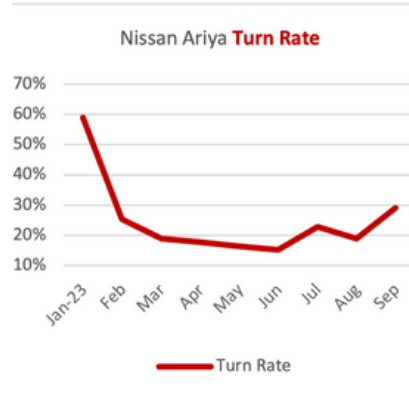
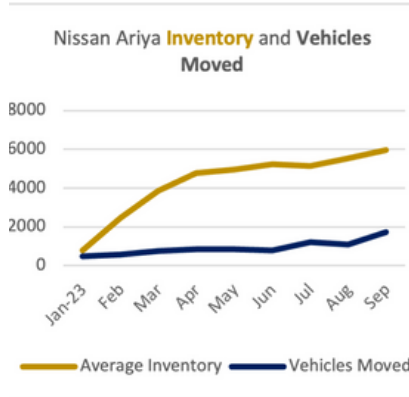
Nissan has announced that they will be selling only electric vehicles in Europe in 2030, which could also expand their EV capacity in the U.S. As Nissan CEO Makoto Uchida said, “there is no turning back now.”¹⁴

In the U.S., this alliance currently has only two vehicles that have average inventory levels of 1,000+. These models have accounted for 13,468 in movement YTD through September, or just 2.3% of its overall portfolio. As for the specific Nissan models, both have growing inventory positions with vehicle movement that is not keeping pace, resulting in declining (and very low) turn rates. Pricing is heading upwards for both.

Summary

Currently, the Renault-Nissan-Mitsubishi Alliance has a limited presence in the U.S. EV market, but its plans to go fully electric in Europe over the next seven years may open up technology and manufacturing capability that can aid in its growth in the U.S. market. This does not appear to be a fast path, however, which may limit its leadership presence in the short or medium-term.

Renault-Nissan-Mitsubishi Alliance



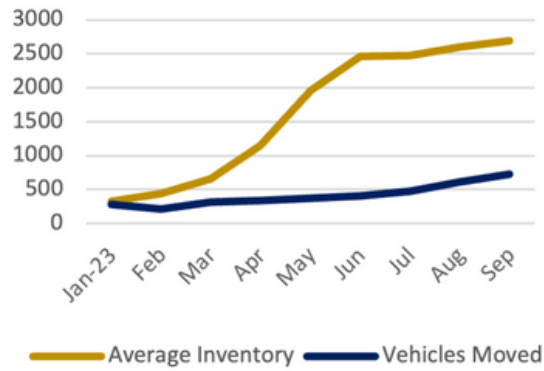
Subaru has just one EV in its lineup—the Solterra—and that model is built in a joint partnership by Toyota. But it has intentions to expand its lineup starting in 2026 with the addition of three new models (which will be built by Subaru directly). Executive VP Atsushi Osaki was recently quoted as saying that Subaru intends to sell 200,000 EVs in 2026 and build 400,000 per year by 2028.¹⁵

Like other manufacturers, the current state of Subaru’s vehicle movement –just 3,757 YTD in 2023 (through September), or 1.0% of its total—is a small down payment towards an intended future state.

Summary

Subaru has big ambitions to be a much bigger player in the EV space. Given its limited scope, low turn rate, and price pressure on its one current offering, as well as its relatively delayed ramp-up timeline (compared to other competitors), it will have to face and overcome challenges to get to their intended destination.

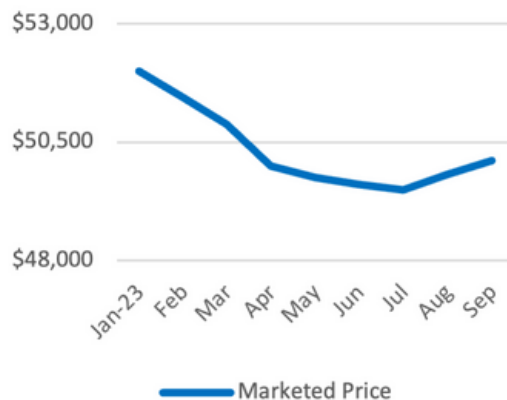
Subaru Solterra **Inventory** and **Vehicles Moved**



Subaru Solterra **Turn Rate**



Subaru Solterra **Marketed Price**



On one hand, Toyota has been slow in ramping up its EV capacity, but on the other, it has a more well-developed hybrid lineup than other competitors. This reflects a long-standing corporate philosophy to address the carbon emissions issue with a mix of battery-powered EVs, plug-in hybrids, and hybrid vehicles. Toyota has previously stated concerns about the maturity of the recharging infrastructure in the U.S., cost of materials (and therefore of the vehicles themselves), and the loss of incentive benefits due to the terms of the Inflation Reduction Act as reasons to slow-roll EVs into the marketplace.¹⁶ This helps to explain the limited scope of Toyota Motor Corporation's current EV offerings.

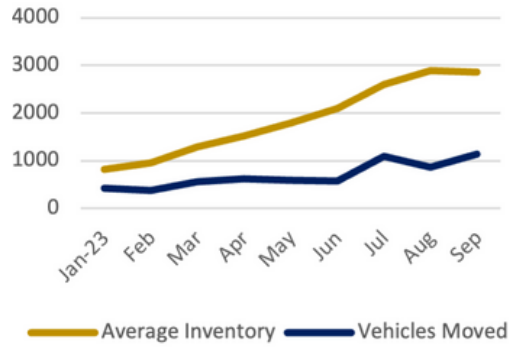
Under new CEO Koji Sato, however, Toyota is moving toward a more aggressive EV stance going forward. It has announced that it plans to introduce 10 new EVs into the marketplace by 2026, with a production target of 1.5M vehicles annually. This comes as Toyota has formed a new business unit that will specialize in EV technology, and will fall under the authority of a single leader.¹⁷

Currently, Toyota Motor Corporation has just one EV model with an average inventory level of 1,000+ in 2023. Its total EV vehicle movement YTD is 8,424—only 0.6% of its overall total, and the lowest of any OEM in the U.S. And that one model—the bZ4X—has seen declines in turn rate and marketed price compared to earlier this year.

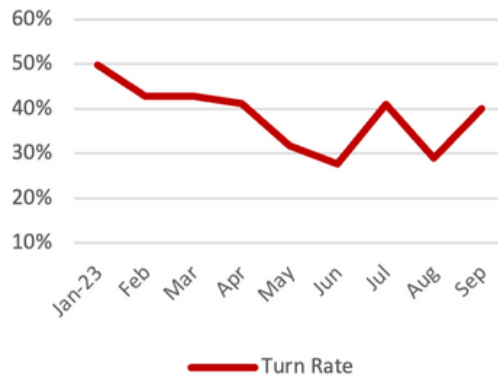
Summary

Toyota Motor Corporation's philosophy is undergoing a shift towards EVs. It remains to be seen to what extent its previous orientation around hybrids is carried forward, and if its delay will hamper its ability to lead in this space. TMC does have a plan to move forward and a long and successful track record of innovation and production prowess, but it has a steep hill to climb to go from its very low current levels to a very aggressive intended outcome in just three years.

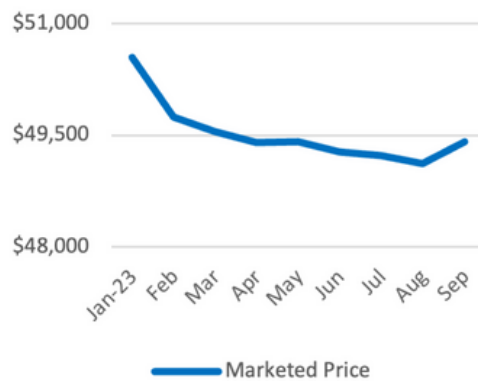
Toyota bZ4X **Inventory** and Vehicles Moved



Toyota bZ4X **Turn Rate**



Toyota bZ4X **Marketed Price**



The Volkswagen Group has four models in the U.S. with average inventory levels of 1,000 or more thus far in 2023. Its YTD vehicle movement of 47,335 (mostly VW and Audi with a small contribution from Porsche) trails only Tesla and Hyundai Motor Group, and represents 11.3% of its total—one of the highest percentages among current OEMs.

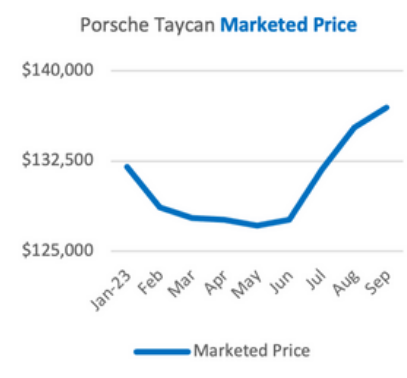
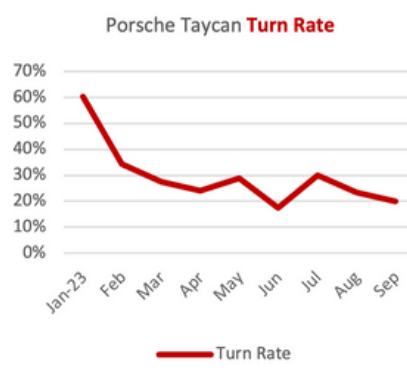
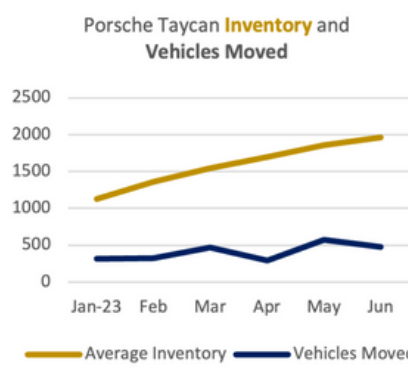
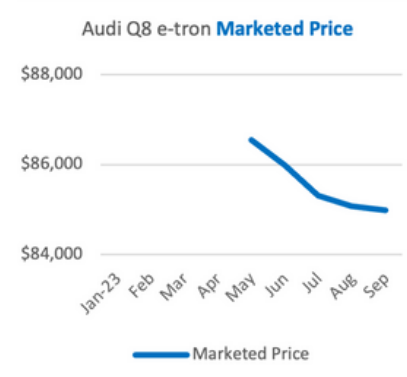
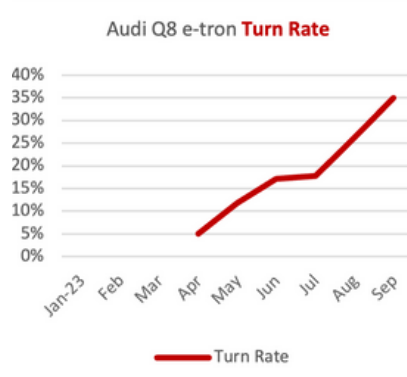
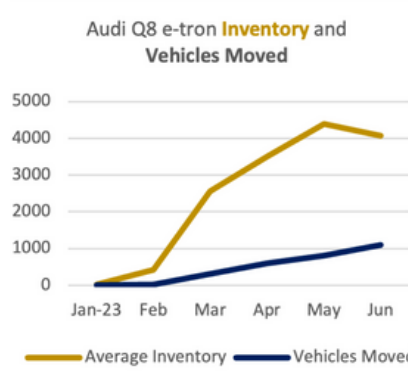
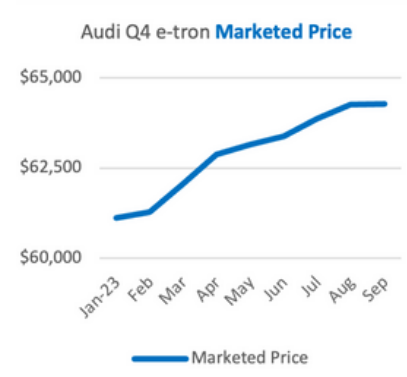
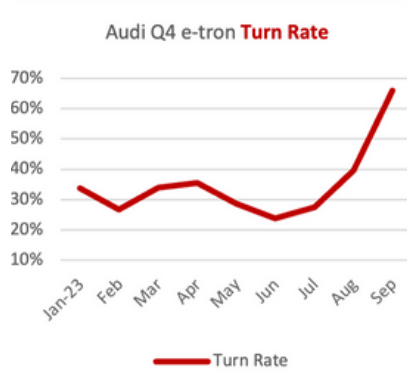
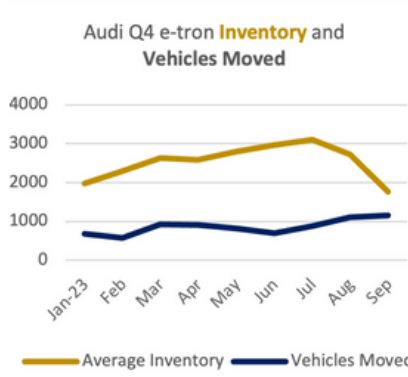
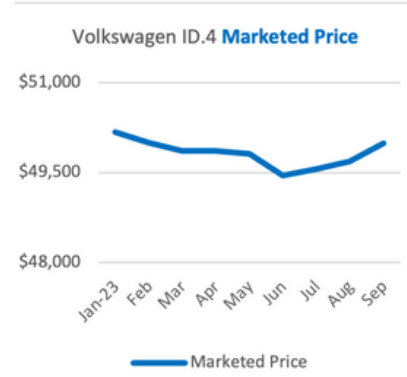
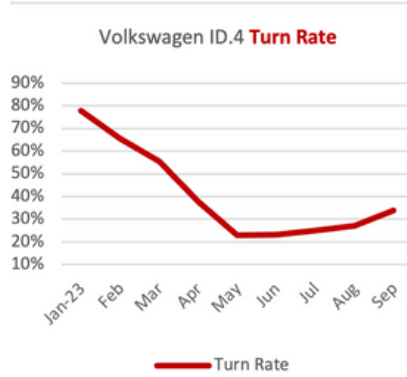
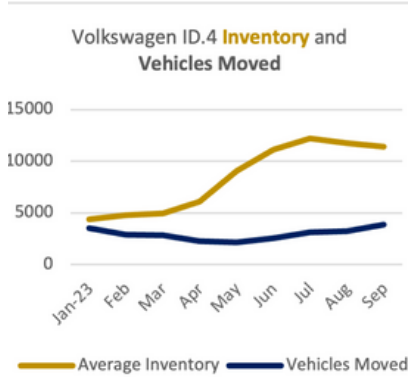
But the Volkswagen Group is facing challenges on a more global scale, with production cuts due to waning demand related to cost, range, and charging infrastructure concerns in Europe. While its VW and Audi models sold in the U.S. are not subject to these production cuts, the bigger picture of increased supply and declining demand is having an impact on its overall operations and corporate philosophy toward EVs, at least in the short term.¹⁸

Its model lineup in the U.S. is at various stages of maturity—from a newly introduced Audi Q8 e-tron to a more established Volkswagen ID.4. For the latter model, it has been subject to a big jump in production without a corresponding increase in vehicle movement, resulting in a sharp drop in turn rate since the beginning of the year. The Audi models in its EV lineup, on the other hand, have experienced jumps on that metric as of late.

Summary

The Volkswagen Group is among the more established OEMs selling EVs in the United States. It remains to be seen whether global issues act as a brake on its progress in this country going forward.

Volkswagen Group



Predicting which OEMs will emerge as a key player in the EV space is hard enough without introducing the prospects of emerging entrants—particularly from China.

There is more than a little consternation that U.S. manufacturing capacity and efficiency will be unable to meet demand at the lower-cost end of the market, which will make it impossible to hit the EV targets required to fulfill EPA standards.¹⁹ Meanwhile, Chinese EV companies are already making great strides in achieving these aims in their home country, and are expanding their manufacturing, operations, and vehicle sales in Europe and the United States.

Chinese OEMs such as BYD, Xpeng Motors, and Li Auto are making significant inroads in quality and cost reductions, and have attracted significant backing from European and U.S. investments. Two of many examples are Berkshire Hathaway's investment in BYD (it owns a 10.9% stake, though this is down from 20% a year ago)²⁰ and Volkswagen Group forging a strategic partnership with Xpeng Motors to build vehicles with VW branding and the Chinese company's software.²¹

In Europe, where a ban on gas-powered vehicles is looming on the same timeframe as U.S. EPA standards, Chinese-made vehicles are on track to account for 20% of EV sales by 2025, and significant lobbying is taking place by Chinese companies to ease U.S. tariffs to open that market up further.²² Tu Le, founder of management consulting firm Sino Auto Insights, told Axios that “the U.S. market is too big for Chinese automakers to ignore.”¹⁹

As noted, Chinese companies have footholds—or more—in selling vehicles in the U.S. Geely’s purchase of the Volvo brand from Ford Motor Company in 2010 established that precedent more than a decade ago. And the looming convergence of an aggressive regulatory environment, Chinese technological and quality advancements, existing and future strategic alliances, and the need to produce lower-cost models to appeal to mainstream buyers will only open the door to Chinese expansion even further.

It is a given that Chinese companies will emerge as a major player in the EV space worldwide. In Q1 2023, for example, BYD sold 260,000 vehicles across the globe—challenging Tesla’s delivery of 440,000 vehicles in the same timeframe.²³ The influence and impact of Chinese EV brands in the U.S. will depend on macroeconomic and geopolitical factors as much, if not more, as it does on supply and demand dynamics. But it is inevitable that they will play a more significant role in this country (and around the world) over the next ten years.

In the financial sector, the “FAANG” group—Facebook (now Meta), Apple, Amazon, Netflix, and Google, is shorthand for extremely large and valuable technology companies. While Apple, Google, and Amazon are more likely automotive players than the other two, the fact that these companies are worth in the hundreds of billions—if not trillions—of dollars makes them all alliance or investment partners given their enormous market capitalizations. Apple and Google have long been exploring the autonomous vehicle space, so the leap to being a major EV player in the not-to-distant future is a very short one. A recent GQ article summed up the relationship between technology and automotive nicely. “Carmakers have for years been trying to incorporate phones and tech into cars, and now it’s the other way around.”²⁴

According to that same article, Apple, which has long aspired to be in the automotive business, is moving closer to full-scale testing (in 2025) and production/launch (in 2026) of vehicles under that brand name.²⁴ Google’s Waymo autonomous vehicle project is forming alliances with EV manufacturers to move toward an all-electric fleet.²⁵ And Amazon’s relationship with and investment in Rivian points to its interest and involvement in the space.²⁶ All three companies have the financial power to build their own EV manufacturing facilities, or to invest in and/or buy car companies that could vault them into a leadership role in the space. And all three have strategic reasons to benefit from doing so in the next decade, making them viable players to be leaders in the auto industry in general, and for EVs in particular, going forward.

Summary and Conclusion

Regulatory requirements are pushing OEMs to aggressively pursue electric vehicle innovation and production in the U.S. (and in Europe) despite a lack of natural demand from consumers related to cost, range, and recharging infrastructure concerns. But this innovation will continue, and the investments, philosophical shifts, and commitments that OEMs and other companies are currently making are a one-way street to a reinvented future for the automotive industry. We cannot un-ring this bell.

But getting to the end of this road, where the vast majority of new vehicles are EVs in just nine short years, will require technological shifts that cannot be foreseen and competitive dynamics that cannot be fully predicted. Will Chinese companies be permitted by consumers and government officials to fill in the gaps at the lower end of the market and bring EVs to the masses? Will the political and regulatory winds shift as new leaders come into power? Will the balance of technology vs. manufacturing shift toward Apple, Google, and Amazon, or will those companies discover that producing and servicing millions of vehicles at scale is harder than it appears? Will Tesla be able to sustain its current competitive advantages, or will it find that shifting from a premium brand to a mainstream one is a divide that is too hard to cross? What alliances will form and what acquisitions will be executed? And which current OEMs—many of which have been a mainstay in the industry since it came into existence more than 100 years ago—will thrive, survive, or disappear in this transformed world?

It is hard, or even impossible, to answer these questions with certainty. What is clear, however, is that the automotive industry is at a profound inflection point and will not look like it currently does ten years from now. No company—not even Tesla—is guaranteed a seat at the head table. But those entities that assume a leadership role in the EV space will be the new pioneers in our industry's ongoing journey of innovation and invention.

Cloud Theory will continue to monitor the industry dynamics in this critical and fast-moving sector and will publish updates and follow-ups to this report on a regular basis and as events dictate.

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Contact

hello@cloudtheory.ai

Cloud Theory
99 Monroe Ave. NW,
Suite 200
Grand Rapids, MI 49503