

## Weekly Commentary 15

### *Electric Vehicles – Competition, Survival and Technological Leadership*

The Electric Vehicle market is fast becoming a major competitive arena for the US, Europe and China. In America, Tesla is already successful and sustainable. Its leader, Elon Musk is the second richest man in the world, with hundreds of billions of dollars to his name.

The Chinese have also found success in this industry, and are using it to boost growth in its economy which is transiting from traditional manufacturing to high technology. There are at least 90 EV startups in the country, and many of them, given the large and diverse market, can survive as niche players with quite a few becoming international benchmarks of excellence, such as BYD and NIO. And if even only 5 of these 90 companies eventually make it to the final line-up of successful auto makers, it will transform both China as well as the global car business. Cars is a big business.

China was never a serious competitor in the car manufacturing industry until three years ago, and its success in EVs gives it a unique opportunity. It has already become the leading car maker in the world. This is important because cars are high value added products. A car is likely to be the second largest expenditure for most families, other than the roof over one's heads.

And there will be good spin off industries including in finance such as hire purchase and insurance not to mention the ongoing venture capital/mergers and acquisitions sought by the emerging car makers. If it succeeds in the auto manufacturing, it will establish the country a recognized industrial powerhouse and its brands will enable the country to gain acceptance as a leading technological leader in the world.

The Japanese and the Europeans were dominant in the global car business, but were slow to switch to the ideology that the world needs to transit to a cleaner technology based on battery power. They are now behind, having lost first mover advantage to Tesla, and then to the Chinese. In Japan, the group of companies that are clustered around Toyota, Nissan, Honda and so on form the corporate backbone of the country. When Germany is deindustrialized by the sanctions on Russian gas, it is primarily the car industry there that is dying. As such, one cannot underrate the importance of cars – it is not just any other industry.

The whole EV scene is not just about the recognizable brands, because in all new industries inspired by technological change, the typical growth path is an initial outpouring of creative and entrepreneurial energy, followed by maturity, declining profits and consolidation which typically reduces the number of players to just a handful. When radio technology began, there were thousands of radio stations in the 1920's. The same with cars. Eventually only a couple of companies in each industry were left.

It is already evolving into this historical pattern in the EV industry.

The Wall Street Journal just published an assessment of the start-ups outside of China, as follows:

## **These Startups Wanted to Be the Next Tesla. Will They Survive the EV Slowdown?**

*Small, money-losing electric-vehicle makers are running down their batteries*

*By*

[Sean McLain](#) The Wall Street Journal

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In the electric-vehicle race, it's increasingly clear that not every competitor will make it to the finish line.

Companies like Rivian Automotive, are burning through their cash reserves as they spend heavily on expanding factory production and sales—all while losing money on every vehicle they sell.

For consumers, the increased competition translates into steep discounts on some of the flashiest electric-powered vehicles. But for EV automakers, a slowdown in demand starts the clock that might determine how long they can keep the lights on.

Many of these companies first unveiled a lineup of innovative battery-powered cars and SUVs in 2018 and 2019, following [Tesla's](#) pioneering success in the new market. It seemed like an army of upstarts was poised to supplant stodgy giants such as Ford Motor and Toyota as the next household name in the industry.

Electric cars were just starting to break into the mainstream, and sales of Tesla's popular Model 3 sedan were taking off.

These young companies went public at stratospheric valuations, even though many had no revenue and little experience building a car. Investors, analysts and ordinary shoppers believed EV makers could emulate Tesla's success in disrupting the traditional car market. Rivian's market value briefly surged higher than that of Ford or General Motors.

Now, these companies are fighting to stay afloat amid stiff competition. Sales of battery-powered cars and trucks have been weaker than expected in the U.S., leading companies from Ford to Tesla to slash prices in an attempt to jump-start demand. Too few buyers have been willing to make the switch to fully electric vehicles, worried about the relatively high sticker prices, still-nascent charging infrastructure and the long-term reliability of EVs. Money-losing startups are pulling back on spending and delaying investments as they seek to conserve their remaining cash.

Some, like electric-pickup maker [Lordstown Motors](#) and battery-powered van company Arrival, have already filed for bankruptcy, and others are producing only a trickle of vehicles.

These carmakers that went public in an era of low interest rates and rising buzz around electric vehicles now have to prove they can withstand tougher conditions. They say they are focused on stabilizing their cash-bleeding operations, but not all of them may be able to weather the storm.

Here's our [\(WSJ\)](#) guide on who could survive the battle of the fittest.

## **Rivian Automotive**

- *Founded 2009, went public via IPO in 2021*
- *Opening share price: \$106.75*
- *Share price as of Friday's close: \$10.80*
  
- *Vehicles sold so far (2021-23): 71,374*
  
- *Quarterly gross loss per vehicle sold: \$43,372*
- *Net loss in 2023: \$5.4 billion*
  
- *Cash reserves at IPO: \$18 billion*
- *Cash burn last year: \$5.9 billion*
- *Cash reserves end of 2023: \$7.9 billion*

**Vehicle Lineup:** Rivian currently sells the R1T pickup and R1S SUV, which start at \$69,900 and \$74,900, respectively. The company also builds an electric commercial van for Amazon.com

**Sales Pitch:** Often compared to the clothing brand Patagonia, Rivian targets affluent, climate-conscious adventure seekers. Company founder RJ Scaringe has said he wanted to build an electric pickup because it is the most popular type of vehicle sold in the U.S.

**How It Got Started:** Scaringe, an avid outdoors lover, started the company in 2009, mortgaging his home for startup funds. Rivian raised billions privately from investors such as Amazon and Ford before going public in one of the most lucrative IPOs of the past decade. The company purchased a former Mitsubishi Motors factory in Normal, Ill., in 2017 to build its first vehicles.

**Quirks of the Vehicles:** Rivian's vehicles have features meant to be useful off the beaten track, such as "camp mode" that levels the vehicle on an incline for comfortable in-car camping and a portable speaker stowed under the center console.

**What Happened:** Supply-chain logjams and problems getting parts to the assembly line meant that Rivian struggled to operate its factory at maximum capacity. The manufacturing challenges contributed to the company burning around \$1.5 billion a quarter. The company also had to redesign key parts of its vehicles in an attempt to bring production costs down. While Rivian was able to overcome many of the logistics snarls holding up its factory output, the company is now warning of weaker demand for its models.

**Where Are They Now?** Rivian is still losing money each quarter and faces immediate challenges in meeting its goal of generating gross profit by the end of the year. The carmaker loses tens of thousands on every vehicle it sells, but executives

say those losses are expected to decline this year. Rivian said it plans to build roughly the same number of vehicles this year as last.

Ultimately, Rivian aims to become one of the world's largest carmakers. The first step in that plan is a new, \$45,000 SUV called the R2, which it unveiled this month and is to go on sale in 2026. The company says this model is key to transforming into a profitable EV maker.

## **Lucid Group**

- *Founded: 2007, went public via SPAC in 2021*
- *Opening share price: \$25.24*
- *Share price as of Friday's close: \$2.77*
  
- *Vehicles sold so far (2021-23): 10,495*
  
- *Quarterly gross loss per vehicle sold: \$145,824*
- *Net loss in 2023: \$2.8 billion*
  
- *Cash reserves at IPO: \$4.8 billion*
- *Cash burn last year: \$3.4 billion*
- *Cash reserves end of 2023: \$1.4 billion*

**Vehicle Lineup:** Lucid currently sells one model, the Air sedan, which ranges in price from the \$69,900 Air Pure to the \$249,000 Air Sapphire. An SUV, called the Gravity, is due to go on sale later this year.

**Sales Pitch:** Lucid sold investors on a plan to build high-end battery-powered vehicles, fueled by what it calls “the best electric-vehicle technology.” The company’s battery and electric-motor technology allow it to squeeze out more mileage than its competitors. Even the cheapest version of Lucid’s Air sedan can travel 410 miles on a single charge, around 100 miles farther than most electric vehicles available in the U.S.

**How It Got Started:** Lucid started life at a battery venture called Atieva. That company’s founders in 2013 hired Peter Rawlinson, a former Tesla executive, who was brought in to help Atieva pivot to car manufacturing. In 2016, Atieva changed its name and Lucid was born. When the company started to run out of cash in 2018, a \$1 billion investment from the Saudi Arabia Public Investment Fund saved it. Rawlinson became chief executive in 2019.

**What Happened:** At first, Lucid appeared to have a deep well of demand, reporting more than 25,000 reservations for the Air in early 2022. With a factory in Casa Grande, Ariz., Lucid seemed both well-funded and well-prepared. Instead, sales have been relatively flat since the second half of 2022. Lucid began flagging slower demand for the Air last February—sooner than other startups on this list. In response, the company has been spending more on marketing and cutting prices to help boost demand.

**Where Are They Now?** Lucid’s newest factory in Saudi Arabia is currently assembling vehicles as part of a deal to sell at least 50,000 to that country’s government. The company is also slated to start production of the Gravity this year.

Company executives say the vehicle will appeal to a wider audience, because SUVs outsell sedans three-to-one in the U.S. Lucid also says it is preparing to broaden its lineup further in 2026, when it plans to launch a new, more affordable midsize vehicle.

## **Fisker**

- *Founded: 2016, went public via SPAC in 2020*
- *Opening share price: \$14.38*
- *Share price as of Friday's close: 12 cents*

• *Vehicles sold so far (2023): 4,929*

- *Quarterly gross loss per vehicle sold: \$23,814*
- *Net loss in 2023: \$762 million*

- *Cash reserves at IPO: \$991 million*
- *Cash burn last year: \$685 million (through Q3)*
- *Cash reserves end of 2023: \$325 million*

**Vehicle Lineup:** Fisker currently sells the Ocean SUV, which costs between \$38,999 and \$61,499.

**Fisker's Sales Pitch:** Fisker has taken a different approach than other startups, employing what it calls an asset-light business model. Rather than building the cars itself, it contracts that work out to an outside company. That way it doesn't have to own a factory itself or employ a manufacturing workforce.

**How It Got Started:** This is the second electric-car startup started by former BMW and Aston Martin car designer Henrik Fisker, who is also CEO. His first company, Fisker Automotive, sold a \$100,000 plug-in hybrid called the Fisker Karma, but it went bankrupt in 2013 after 300 vehicles were destroyed in a hurricane and its battery supplier went out of business.

**Four Unique Features:** "Each Fisker has to have at least four unique features that have to be either best-in-class or something nobody else has," says the Fisker CEO. The features include the Fisker Ocean's "California mode," which opens every glass panel, except the windshield, and a small foldout shelf dubbed the taco tray. The company's forthcoming Alaska pickup truck has a "cowboy hat holder" and "the world's largest cup holder."

**What Happened:** Fisker only started delivering vehicles to customers halfway through 2023 after missing self-imposed deadlines. The company says it ran into delays securing parts and regulatory approval. As a result, it slashed its production outlook twice last year, but ultimately fell short of even its reduced goals.

**Where Are They Now?** Fisker warned at the end of February that it risked running out of cash this year. As of mid-March, the company had nearly 5,000 unsold vehicles and its cash reserves had dwindled to \$89 million. Fisker says it is raising \$150 million in fresh funds from an investor and is negotiating with a large carmaker for another investment. Fisker has hired restructuring advisers to help

prepare for a potential bankruptcy filing, according to people familiar with the matter.

### ***Polestar Automotive***

- *Founded: 2017, went public via SPAC in 2022*
- *Opening share price: \$12.98*
- *Share price as of Friday's close: \$1.62*
  
- *Vehicles sold so far (2020-23): 144,000*
  
- *Quarterly gross profit per vehicle sold: \$257*
- *Net loss in 2023: \$468 million*
  
- *Cash reserves at IPO: \$1.4 billion*
- *Cash burn last year: \$1.7 billion*
- *Cash reserves end of 2023: \$770 million*

Note: Gross profit per vehicle, net loss and cash burn are as of end of September, 2023, because the company has yet to release full-year results.

**Vehicle Lineup:** The carmaker sells three models: the \$49,200 Polestar 2 sedan, \$73,400 Polestar 3 SUV and approximately \$60,000 Polestar 4 SUV.

**Sales Pitch:** Like Fisker, Polestar doesn't own manufacturing facilities, and instead contracts to have its vehicles built at other companies' factories in China, South Korea and the U.S. Unlike most electric-car makers, Polestar says it doesn't want to make a mass-market EV. Instead, the company pitches itself as a sportier alternative to Volvo.

**How It Got Started:** Volvo Car and its Chinese parent, Geely, created Polestar as an EV-only brand in 2017. The company started by selling a hybrid, the Polestar 1, before launching the fully electric Polestar 2 in 2020.

**Quirk:** Polestar vehicles bear more than a passing resemblance to electric vehicles made by Volvo. That may not be surprising given that the CEO, finance chief, operations head and lead designer are all former Volvo executives.

**What happened:** Polestar appeared to have the smoothest launch of any of the current crop of EV startups. It has built over 100,000 vehicles since starting production and has even turned a profit in some quarters. But Polestar has faced slowing demand for its Polestar 2 sedan and the launch of its Polestar 3 SUV was delayed after Volvo ran into software development issues. The company has slashed its production outlook and Volvo said last month that it will sell the majority of its 48% stake in Polestar.

**Where Are They Now?** Polestar's finances are now stable after raising nearly \$1 billion in debt last month. Production of the Polestar 3 has started in China, and a U.S. plant is due to start producing the vehicle later this year. Polestar's chief financial officer says the company is targeting a double-digit gross margin by the end of 2024. The company says the U.S. launch of the Polestar 3 SUV this year will help boost sales.

## **VinFast Auto**

- *Founded: 2017, went public in 2023*
- *Opening share price: \$22*
- *Share price as of Friday's close: \$4.96*

• *Vehicles sold so far (2021-23): 115,000*

- *Gross loss per vehicle sold: \$4,626*
- *Net loss in 2023: \$2.4 billion*

- *Cash reserves at IPO: \$131 million*
- *Cash burn last year: \$3.3 billion*
- *Cash reserves end of 2023: \$168 million*

**Vehicle Lineup:** In the U.S., VinFast currently sells the \$46,000 VF8 SUV. A larger SUV called VF9 is expected to go on sale this year, starting at \$79,800. VinFast also sells battery-powered scooters in Vietnam.

**How It Got Started:** VinFast was created in 2017 by Pham Nhat Vuong, the billionaire owner of Vietnamese conglomerate Vingroup, which operates a diverse array of businesses from hospitals to theme parks. VinFast built a massive \$1.5 billion factory east of Hanoi, which the company has said will be capable of producing nearly a million vehicles a year by 2026.

**VinFast's Sales Pitch:** VinFast aims to compete with Chinese EV startups like BYD and NIO, and says that building cars in Vietnam means its labor costs are even lower than those of Chinese competitors. The company is expanding across Southeast Asia and in India, while also aiming to increase its sales in the U.S.

**Quirk:** Early buyers in the U.S. were offered free stays in one of Vingroup's resorts in Vietnam. People who buy a home in Vietnam from the company's property arm may also get a free car as part of the deal.

**What Happened?** VinFast tried an innovative pricing strategy in which it sold cars to customers but rented the lithium-ion batteries that power the vehicles separately. The company said the plan allowed customers to pay less upfront for VinFast vehicles, but ended up ditching the plan in the U.S. for now, because customers found it confusing. Ultimately, VinFast only delivered a little over 3,000 vehicles to U.S. customers last year, according to Motor Intelligence.

The company also had a rocky debut on Wall Street. Initially, its share price skyrocketed, briefly making VinFast more valuable than Ford or GM, in part because only a small percentage of the company's shares were available for trade, boosting demand for them. Since then, the stock price has tanked as the company faced challenges getting its first batch of cars to U.S. consumers. Reviewers panned the VF8 for quality issues.

**Where Are They Now?** VinFast is building a \$2 billion factory in North Carolina, which will allow its vehicles to potentially qualify for a federal tax credit. Over 70% of VinFast's passenger vehicles and nearly half of its scooter sales last year were to a taxi company owned by Vuong, the head of Vingroup. VinFast has said it plans to

deliver 100,000 electric cars and SUVs this year, but hasn't said how many will be to customers outside of the Vingroup network.

*Electric vehicle manufacturers like Lucid, Lordstown Motors and Faraday Future were big winners of the stock boom two years ago. Now all three companies' shares have fallen dramatically.*

*WSJ's Dion Rabouin and George Downs discuss why. Photo illustration: David Fang*

You may be wondering about the title of the WSJ article – what slowdown? Isn't the EV industry growing from strength to strength, clocking impressive growth?

Well, what happens in China does not happen everywhere. Recent data shows that the growth of the EV market in America is actually slowing. There are many new cars sitting in parking lots waiting to be sold. And as can be seen above, this is affecting the fortunes of the start-ups wanting to be like Tesla.

If the WSJ is right, the EV start up scene in the US is in trouble. The dynamism represented by Tesla may be over. Tesla is now exporting cars from China. Imagine that.

And without new dynamism, the baton will pass to China.

The stakes are humongous in the EV business. The capital investment is massive; distribution channels need to be set up and many have to find their market niche. It is competing not just with other EV makers but with petrol engine cars as well. Everybody wants to be like Elon. The question is whether Elon Musk is a market leader, the first of a kind, or whether he fluked it. The evidence seems to be that outside of China, especially in the USA, Tesla is not the sustainable model where an entrepreneur gets the BIG idea, raises the funding and then proves himself in the market-place.

Of course, the risk is very high as in all venture businesses, but hey this is not a game for the timid. If you make it, you may become one of the richest people in the history of mankind. That emulation of Tesla seems to be losing steam. This has implications for all EV makers that are now in existence, but also for the technological competition between the US and China.

Has the enthusiasm for EVs died in the US? This is exactly the questions that these EV bosses must be asking. iThe Economist has a view on that:

### **Is America's EV revolution stalling?**

#### ***Its motorists aren't won over by battery power - yet***

Americans love their automobiles. So long, it seems, as they don't run on batteries. A poll published in July by the Pew Research Centre found that less than two-fifths of them would consider buying an electric vehicle (ev). Despite expanding charging networks and more ev models to choose from, that is a slightly lower share than the year before.



Those words are backed up by relative inaction. In the third quarter of 2023 battery-powered vehicles made up 8% of all car sales. So far this year fewer than 1m evs (not counting hybrids) were sold in America, a little more than half the number in less car-mad Europe (see chart). Chinese drivers bought almost four times as many. Between July and September General Motors (gm) shifted a piddling 20,000 in its home market, compared with more than 600,000 fossil-fuelled vehicles. Fully 92 days' worth of evs languish on dealership forecourts, compared with 54 days of gas-guzzler inventory. Outside California, Florida and Texas, which together account for over half of American ev registrations, electric cars mostly remain a curiosity.

Disappointing demand is now prompting carmakers to reassess some of their ambitious electrification plans. In October Ford said it would delay \$12bn of ev investments. GM has ditched some ev targets and put off by a year a \$4bn scheme to turn an existing factory into one for e-pickups, among other ev-related savings; it will instead pay out a record \$10bn in share buy-backs in 2024. Carmakers' battery-making partners are turning cautious, too. In September sk Battery laid off more than 100 employees and reduced output at a plant in Georgia. In November lg Energy Solution, a fellow South Korean firm, said it was laying off 170 workers in Michigan.

All this presents bumps on the road to electrified motoring in America. The car industry's ability to swerve around them will determine the fate of its energy transition. And, since passenger cars contribute a fifth of American total carbon emissions, it will have an effect on the country's decarbonisation efforts, too.

The biggest brake on ev enthusiasm in America is price. The average ev there sells for \$52,000, reckons Cox Automotive, a consultancy. That is not a world away from the \$48,000 that Americans typically pay for a petrol vehicle. But total costs of ownership, which combine the sales price and running costs for five years, vary more widely. At \$65,000, the typical ev is \$9,000 more expensive to own than a petrol car (owing to factors like pricey home chargers, dearer insurance and, compared with Europe and China, inexpensive petrol). On Ford's latest earnings call executives grumbled that Americans were stubbornly "unwilling to pay premiums" for evs.

A new tax credit of up to \$7,500 for ev purchases offsets some of this cost disadvantage. But it applies only to cars that obey strict rules of origin for components. It is also fiddly; buyers must file a form with their federal income-tax return. EVs' low adoption rates, relative novelty and rapidly evolving technology, meanwhile, make it hard for buyers to tell how fast they lose their worth, which may put some off the purchase. Others may be discouraged by quality problems. In recent years evs have been recalled because of faulty battery packs. Seven of the ten car models that face the most basic problems, such as with door handles, are evs, according to a survey by J.D. Power, a research firm.

Cheap and cheerful evs tend to offer better value for money. But in America it is hard to find a set of electric wheels for less than \$30,000. American carmakers have followed Tesla, the ev pioneer, in focusing first on higher-margin premium models rather than evs for the masses. GM and Honda, a Japanese giant, recently dropped their joint \$5bn plan to build an affordable ev. Inexpensive and decent-quality Chinese evs from companies such as BYD have turned China into the world's biggest ev market and may soon flood Europe. They are, however, all but excluded from America by high tariffs and other

barriers.

All this leaves America's car industry circling a roundabout. **Consumers' unwillingness to pay for expensive evs** is forcing carmakers to offer steep discounts to shift inventory. **(There are good reasons for this – ev's don't seem to maintain value. I have read that in the case of the Porsche EV, a very high end model, it depreciates quickly and becomes almost worthless after three years. )** Tesla has slashed its prices several times in the past year. Carmakers are offering average discounts of almost 10% on their evs, more than twice as generous as for petrol cars. But this is making it even harder for the companies to make money from battery power. Ford's electric division is losing about \$62,000 for every vehicle it sells, in contrast to a net profit of \$2,500 apiece for the company's petrol cars. Continued losses in turn may temper car firms' appetite to invest in a broader electric offering that would appeal to buyers.

American carmakers are still hoping they can escape this vicious circle. They are mostly postponing their American ev investments rather than pulling the plug on them. In the next year or two many companies are expected to unveil dedicated electrified "platforms", as a car's structural backbone is known, rather than lumping batteries unsatisfyingly onto existing petrol-driven skeletons. Some of the evs' quality problems are teething pains typical of all new models, be they electric or petrol-powered, which will be sorted out as production lines mature. And from January the ev tax credits will also be available at the point of sale, making it less burdensome for buyers to take advantage of them.

All this could eventually improve quality, expand product ranges, push down costs and, with luck, generate profits for car firms. Eventually may, though, come a bit later than hoped.

**I mean, this is not good news for the start-ups and the traditional car makers switching to EVs. As demand slows, and if China is so competitive that it dominates the EV market, they will all continue to sell cars that lose a ton of money every time a sale is made. It is not a viable business.**

**Business Insider has a similarly pessimistic view:**

### **What happened to EVs?**

***The sudden slowdown in electric car sales is a symptom of a much uglier problem.***

*Fewer people are buying electric cars — the slowdown hints at a problem at the heart of America's EV push. Tyler Le/BI*

Electric vehicles were supposed to be inevitable. Two years ago President Joe Biden climbed behind the wheel of a beefy white electric Hummer to tout his plan to make half of all new cars sold electric by 2030. The following year Congress passed the Inflation Reduction Act, which created a bevy of incentives for drivers to buy electric and for automakers to invest in EVs. That set off a flurry of new projects: EV plants, battery-manufacturing facilities, and mining operations began popping up. By the end of 2022 the situation looked promising: More and more Americans were

going electric, and soon everyone would be driving an EV, reducing emissions in the process.

The transition to an all-EV future seemed like a slam dunk. It would not only give the government a highly visible way to show it's fighting the climate crisis but boost the economy through new jobs and investment. But the electric-vehicle takeover has hit some serious roadblocks.

Sure, sales of EVs keep going up — a record 300,000 cars sold in the US in the third quarter of 2023 were electric — but the pace of adoption has markedly slowed, and analysts have suggested the country is no longer on track to hit the government's sales targets. The trickle-down effects of this decreased demand are everywhere. EVs accumulated at dealerships this fall, even as automakers cut prices to try to entice customers. Automakers have backtracked on their promised investments: Ford delayed \$12 billion of its planned \$50 billion investment in EV manufacturing capacity, while General Motors delayed production of key EV models and scrapped a \$5 billion partnership with Honda to make cheaper EVs. Even Tesla — once the superstar of EVs — announced it would delay a planned factory in Mexico. Auto execs who were once trumpeting the potential of electric cars are even publicly acknowledging that EVs aren't working.

Industry analysts have pointed to several reasons for the slowdown, including insufficient charging infrastructure and a lack of affordable EV options. But they're a symptom of the larger problem: America's EV plan was flawed from the start. Instead of seeing EVs as one piece of a plan for more sustainable transportation, America has focused on using EVs as a one-to-one replacement for gas guzzlers. But this one-size-fits-all solution fails to address our broader transportation problems, meaning emissions targets are likely to be missed and other transportation problems will continue to go unaddressed.

"The entire myth at the heart of this whole transition is that the battery car seamlessly fits right into the gas car's position," Edward Niedermeyer, the author of "Ludicrous: The Unvarnished Story of Tesla Motors," told me. "It doesn't, and that's the problem."

### *The EV myth*

The mission to replace gas cars with EVs has led to a series of major miscalculations, one of which has to do with the sheer size of the new electric vehicles being put on the road.

Over the past few decades the American auto industry has become obsessed with huge vehicles. The reasons for the size inflation range from profit margins to distorted government fuel standards, but the proliferation of bigger vehicles created a doom loop of consumer preference: Drivers saw the vehicles around them getting bigger, so they wanted bigger cars to make themselves feel safer. Automakers argued that this was proof that people wanted only big cars, so they cut small models and made existing vehicles bigger, which made people with smaller cars feel less safe — you get the picture. Meanwhile, road deaths and injuries soared, while the larger, less efficient vehicles wiped out environmental benefits from higher emissions standards.

*The entire myth at the heart of this whole transition is that the battery car seamlessly fits right into the gas car's position.*

When automakers pivoted to EVs, they focused on the kinds of cars that were already popular — which meant a flood of big electrified SUVs and trucks. But massive-bodied EVs don't make much sense. Larger EVs require bigger batteries, which require more raw materials to manufacture, which requires producers to beef up their environmentally destructive mining operations. While bigger batteries allow drivers to travel farther between charges, they also make the cars heavier, more dangerous, more expensive, and worse for the planet.

The "**range anxiety**" that has resulted in massive batteries is another reason EVs don't work as a replacement for gas cars. Niedermeyer said that while an electric car can meet most people's driving needs, it struggles with edge cases like road trips because of the need to recharge. Since Americans have been promised a one-to-one substitute for their gas cars, this seems like a failure; an EV should be able to do everything a gas car can. This idea persists even though in 2023 the average US driver traveled only about 40 miles a day, and in 2022 about 93% of US trips were less than 30 miles. Still, in a survey conducted by Ipsos last fall, 73% of respondents indicated they had concerns about EV range.

The focus on increasing EVs' range is contributing to their relatively high prices. Unlike with gas cars, the more you pay for an EV, the more range you can expect to receive. And since Americans have been conditioned to want a lot of range, cars with big batteries and longer ranges have dominated the market, resulting in stubbornly high prices. In September, Cox Automotive pegged the average EV price at \$50,683, down 22% from the same time last year. But an analysis from CarGurus found that EV prices were still 28% higher than gas-vehicle prices on average. With prices for everything else — rent, groceries, and other goods — increasing, the average person has less cash to splurge on an expensive electric vehicle.

All of this means there's a natural limit to the number of American households willing and able to make the shift to electric. They've largely been high-income households in places like California, where charging infrastructure is more plentiful. The polling firm Strategic Vision found that EV buyers have a median household income of \$186,000. Cox estimated that 8% to 9% of new-vehicle sales in the United States in 2023 would be electric, but getting above that threshold is proving to be more difficult than expected.

### *The Norway model*

If there's any direct inspiration for the United States' EV policy, it's Norway. As the story goes, Norway introduced some compelling subsidies for EVs, sales took off, and now the vehicles virtually dominate the roads. But the reality isn't so simple. And Norway's challenges bode poorly for America's EV push.

*Norway shows that if US policymakers stick with the current model of EV transition, it's going to be a difficult road.*

Norway introduced EV incentives in the 1990s, then added more when EV technology really took off in the 2010s. EV drivers could get perks like free parking, permission to drive in bus lanes, and, most importantly, exemptions from taxes and fees that could ultimately save them a lot of money. In September, 87% of new-vehicle sales were fully electric vehicles. The problem, Ketan Joshi, a climate-analysis expert in Oslo, told me, is that that stat "doesn't really give you a good picture of the rate of change." Though the new-vehicle sales figure is high, data from Statistics Norway indicates the total share of EVs on Norwegian roads in 2022 was only about 20% — there's still a long way to go until everyone's driving electric.

Even with this shift, Norway isn't on track to meet its 2030 emissions-reduction targets. While emissions from passenger vehicles have fallen slightly, Joshi said, those reductions are being canceled out by an increase in emissions from trucks. People in Norway own more cars than they have in the past, in part because EV incentives encourage people to buy *more* cars, and the government has no plans to reduce how much people are driving. The researcher Benjamin Sovacool and his colleagues have pointed out that, just like in the US, EV buyers in Norway "tend to be in higher income brackets, often using their EV as a second car."

The Norwegian approach has also had a ton of unintended consequences. Joshi told me that the decline in gas tax revenue due to EV adoption had triggered a contentious political debate about increasing road tolls to make up the difference. (A political party was even formed on the platform of stopping the tolls.) Plus, heavier electric vehicles are harder on roads, produce more air pollution, and pose a greater safety risk for pedestrians.

Norway has made great headway in getting buyers to go for EVs, but it's not a silver bullet, especially on a short timeline. "It shows you the extreme slowness of transition that is basically guided by the rate at which people buy a new car," Joshi said of Norway's approach. Reducing transportation emissions by incentivizing people to replace their car with an EV is incredibly slow. And for countries like the US that got started late, it's a warning sign.

Norway shows that if US policymakers stick with the current model of EV transition, it's going to be a difficult road. Even if adoption keeps ticking up, it will take a long time to get existing internal-combustion-engine vehicles off the road and see a notable decline in transport emissions. Plus, there will be other issues to deal with like increased road maintenance and pedestrian safety.

"Narrow success in one area is not something you necessarily want to emulate," Joshi said.

### *Time for a rethink*

The shift from gas-powered cars to electric vehicles is an opportunity to rethink how Americans get from place to place. But so far the US government, carmakers, and consumers have been pursuing a small-minded swap that lacks the necessary ambition.

Getting Americans to ditch driving altogether would be the most effective way to reduce emissions, but it would require a massive rethink of our transport system. Something like that doesn't happen overnight, and given the decades-long lack of investment in anything other than car infrastructure, there are plenty of other opportunities for a better future. If the government and automakers are serious about making transportation more sustainable, they should be incentivizing smaller vehicles, hybrid cars, and public transportation like trains and buses.

EVs can be an important part of the fight against the climate crisis, but America's EV plan needs to lean into what these cars do well: short daily trips that can be taken in small, affordable cars. People who frequently take long trips can take advantage of hybrid cars. And better public transit and faster intercity trains could make a huge difference for people and the planet.

While it may be a sexy and industry-friendly approach to the climate crisis, an EV-first plan isn't the most effective way to tackle the enormous challenge we face.

If we read the above analysis that in the US, the EV experiment is failing, we have to then see if China's way is better. We have seen how China's car industry has become the largest in the world, in just the last three years. Is there something for the US to learn here?

### ***The China Model – How did China succeed?***

I have covered the many factors that enabled China to build a successful EV industry in previous commentaries. I will go through these again, because in the context of the above information which point to the fact that going from fossil fuel cars to EVs is not a straight path means that the Chinese have got it right. Here are my views:

- 1) The domestic market for all kinds of cars must be humongous. That's what the Chinese have. It is generally true that for any new business to succeed, it needs to build a sustainable stream of profits based on low unit costs of production.
- 2) Before they started with the EV experiment, Chinese cities were highly polluted. That gave them the impetus to switch to cleaner technology.
- 3) The central planning system is definitely a helpful factor for the rapid adoption of EVs. If the government was not behind it, the charging infrastructure would not have grown so fast. That enabled the industry to solve the "range problem" which led to rapid adoption.
- 4) The supply chain was also taken care of by benevolent government planning. In particular, the existence of strong battery makers in the value chain certainly helped to push the technology forward. In particular, the convergence of strong technology players in various parts of the value chain enabled the sum of parts to be established quickly and effectively.
- 5) Because EVs in China are relatively cheap, it helped to promote early adoption. Price is obviously very important in a capital intensive purchase, and the

earliest success of EVs in China is based on low cost models. The BYD Seal is a great example.

- 6) Because China is an oil importer, the cost of operating fossil fuel cars is never inexpensive. Switching to EVs would make sense to the burgeoning middle class trying to get into car ownership for the first time. Needless to say, the government's strong incentives for EV ownership helped. In this case, it is the non-price incentives that were found to be popular. In some cities, there are restrictions on driving petrol cars on certain days of the week, but EVs are always allowed on the roads.
- 7) China is very good at manufacturing. It has established itself as a manufacturing powerhouse. The ability to switch to making cars is not so difficult for the country as a whole. The ability to source for components throughout its value chain can also be accomplished effortlessly.
- 8) The Chinese car makers are also smart enough to recognize that buying a car is a major decision for more families, and they have hired top European designers to come up with aesthetically pleasing models. There are also many software improvements found in Chinese EVs these days, all of which make them desirable.
- 9) China's government cleverly embraced Tesla and effectively made it a Chinese powerhouse. Don't get me wrong, Tesla is not a Chinese company, and most Teslas which people in the world buy may originate from its Shanghai based mega factory. The Chinese have made Tesla synonymous with Chinese EV making. And when its own domestic companies caught up in capabilities, such as BYD did, there is quick brand recognition.

The Chinese EV industry has grown from strength to strength, and is now an export engine as well. It has become important for China to push this technology and this product. The country's car makers are being encouraged to sell their output in the Global South where again, there are many in the middle class aspiring to be car owners and the value for money is topmost on their minds. And for Russians, they could not buy European cars directly from Europe anymore and Chinese EVs are the best option. Both these groups of buyers helped China move up the ladder of top car makers in the world and they will likely enable them to dominate the car industry as brand value become recognizable in the coming years. Even if the EU or the US impose tariffs on Chinese EVs, there is a massive market in the Global South for its products.

When Chinese brands become synonymous with good design, reliability and value for money, they will be selling 10million cars a year. That is slated to happen before 2030.

When that occurs, car making will be acknowledged to be China's crowning industrial achievement in the 21<sup>st</sup> century.

This will set the stage for the next technological battlegrounds. Wide body jets and then AI.

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