



# PLUGGED IN

AN EV NEWSLETTER

Volume 2, Number 2

## Editor's Note

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Dear Readers,

Our collaboration with guest authors continues to ramp up, this time with an author from half way around the world! Welcome to yet another enthralling edition of *Plugged-In*, where we hear from Rajendra Bhinge, ex-chief executive officer of Tata Strategic Management Group, ex-executive director of Tata Industries, and currently the Chairman of Antennae Ventures Pvt. Ltd., an accelerator of innovative, tech-driven startups. Based in the city of Mumbai in India, Mr. Bhinge recently co-sponsored the set-up of an EV powertrain lab at his alma mater, IIT-Mumbai, which envisions transforming research and innovations in the EV space at the renowned institution. Mr. Bhinge is a fervent EV enthusiast and runs his own blog on all things EV dedicated to the Indian market. In this edition, he shares a data-driven comparison of EV markets in the USA, Europe, China, and India, highlights the initiatives of the Indian private sector and its government to boost EV sales, and previews the challenges in the road ahead. The Indian auto market is unique because of its high reliance on two-wheelers and three-wheelers, a segment where India sells a majority of its EVs right now. As a cash and mileage conscious society, keeping the price-point low will be critical to draw EV consumers. I'm sure you will find this article insightful and informative.

In this edition, we also share the second part of a three-part series of an interview between John McElroy and Co-Chair of DW's EV Initiative, Bob Weiss. The interview covers a lot of ground – from John's view of the rate of adoption of EVs (spoiler alert: John does not believe that the government and industry projections for 2030 will be met), discussion of evolving game-changing technology that will materially impact customer acceptance, the future of EV start-ups,

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traditional OEM competitiveness, and the prospect and timing of Chinese EV manufacturers to enter the U.S. market and their potential impact. I am confident you will enjoy reading John's candid, informative and entertaining perspectives on these timely and important issues.

Lastly, on a personal note, it's been a pleasure to have been on this ride as the editor of *Plugged-In* for the past year. When I ventured on this journey, I was doubtful of the newsletter's survival but here we are, going strong and collaborating more than ever on our shared love for EVs while having a front row seat to this wild time in automotive history. I want to thank all our contributors so far, especially the guest authors who shared their industry perspective, and most of all, the readers. I'll continue to be part of the firm's EV Advisory Board and look forward to staying...*Plugged-In!*

**Rasika A. Kulkarni** | Editor and Associate Attorney

## **Electric Vehicles in India - Challenges and Opportunities**

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### **Introduction**

Global sales of Electric Vehicles (EVs) in 2023 reached a record 13.6 Mn units. Of this, 9.5 Mn were Battery EVs (BEVs) and the rest were Plug in Hybrid EVs (PHEVs). Penetration of EVs touched 16% of total new vehicle sales of around 86 Mn in 2023. EV sales in 2024 are expected to reach 16.7 Mn units according to Bloomberg NEF. The major markets for EVs are USA, Europe, and China – each having unique characteristics.

### **US Market**

EV sales in the USA were 1.19 Mn units in 2023 with a penetration of 7.6% of the total passenger vehicle market of 16.65 Mn. Sales are expected to rise to around 1.7 Mn in 2024 with a 10% share as prices have started falling, supply is outpacing demand, and after a period of volatility, costs have begun declining.

The Total Cost of Ownership (TCO) of EVs is already quite favourable compared to equivalent Internal Combustion Engine (ICE) vehicles. The initial price difference between EVs and ICE vehicles has narrowed and with tax credits under the IRA, is likely to disappear. The average price of a new EV is around \$50,000. Most manufacturers are positioning EVs at the premium end of their range.

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Tesla is the market leader with a 55% share. It has set up a charging infrastructure which caters to its own products. Other manufacturers, to address customer anxiety, have signed up to access this infrastructure.

## **Europe**

In 2023, EV sales rose to 3.3 Mn in a total car market of 14.4 Mn – a penetration of around 23%. Germany has ended all subsidies for EVs as penetration has crossed 35%. EV sales in 2024 are expected to be 3.6 Mn units. Average prices of EVs are around \$60,000 – with an emphasis on luxury and high end models.

Europe is likely to become a competitive battleground with the imminent entry of Chinese EVs especially in the middle and low price segments. Geely already owns Volvo and Lotus. BYD, which overtook Tesla in EV sales in the latest quarter, is setting up an EV plant in Hungary.

## **China**

China sells more EVs than the rest of the world put together with a 60% global share. In 2023, EV sales hit 8 Mn in a total car market of about 22 Mn – a penetration of over 35%. In 2024, EV sales are likely to reach 9.7 Mn even as subsidies have been withdrawn. There are over 90 EV brands, mostly domestic, with prices ranging between \$5000 and \$90,000. The market leader BYD alone sold 3 Mn EVs in 2023. With well developed supply chains and economies of scale, Chinese manufacturers can innovate rapidly, cut cycle times for new products, and sell low priced EVs with superior technology – infotainment, sound, and connectivity. These factors can make Chinese manufacturers formidable competitors as they expand globally.

## **India**

In 2023, EV sales in India reached 1.53 Mn – a growth of 50% year-on-year. Of this, almost 56% (858,000 units) were electric 2 wheelers (E2Ws) and 38% (576,000 units) were electric 3 wheelers (E3Ws). Only 5% (81,000) were electric cars (E Cars) in a market of about 4.1 Mn. Penetration of E2Ws has reached 6% while for E3Ws it is 54%. EV sales are poised for rapid growth in the coming years.

The government's main incentive scheme, Faster Adoption and Manufacturing of Electric Vehicles, now in its phase II (FAME2) provides a subsidy based on battery capacity for E2Ws, E3Ws and E buses (with conditions and limits). This subsidy is intended to bridge the price gap between EVs and ICE vehicles. With this, the TCO for E2Ws is already lower than comparable ICE vehicles. Subsidies have been reduced midyear in 2023. Nevertheless, after a brief dip, sales have rebounded and are on a rising trend. Penetration of E2Ws is likely to reach 40% by 2030.

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E Cars for personal use do not get any subsidy. Hence sales have been driven by TCO alone. The difference between the TCO of ICE cars and E cars is currently barely under 10%. With several E Car launches slated for the next two years, this is likely to reduce further and sales are likely to grow exponentially. Penetration is expected to rise from the existing 2% to around 20% by 2030.

Domestic players dominate the EV market in India. In E2Ws, Ola Electric, with 30% market share, TVS Motors (20%) and Ather Electric (12%) are the leaders. In E Cars, Tata Motors with 67% share is the market leader. BYD has not received permission to invest in India. Most E Cars are currently sold in the price band of \$10,000 and \$20,000.

Charging infrastructure has been a major inhibitor so far. E2Ws are often charged at home. For E Cars, a major initiative to resolve this problem is underway. Petroleum retailing companies such as Indian Oil Corporation, Bharat Petroleum Corporation and Hindustan Petroleum Corporation have announced plans to add fast battery charging at around 10,000 fuel stations on national highways – often in partnership with electric utilities or charging equipment suppliers. Further, all housing projects, hotels and multiplexes are being encouraged to install charging infrastructure in their premises. The results will be visible in the next 2-3 years.

### **Challenges and Opportunities between USA and India**

The biggest challenge for other countries is competition from Chinese EV producers and the head start they enjoy in volumes, costs, technology, and supply chains. The critical technologies relating to materials, batteries, motors, and power electronics are owned by Chinese firms. The entire value chain from mining of lithium and rare earths to refining and component making is dominated by them with a share of 70-80% of global output.

With geopolitical tensions rising, Governments across the world are responding with a range of policy measures. In India, the policy thrust is to incentivize domestic production of EVs and major components. India's Production Linked Incentive (PLI) scheme for EVs, applicable over a 5 year period, covers two groups:

- Automotive Sector: The incentive is up to 18% of the eligible sales value of zero emission vehicles (BEVs and Hydrogen Fuel Cell EVs) and their components. The outlay is about \$3Bn.
- Advanced Chemistry Cells(ACC): The objective is to attract investment of approx. \$5Bn in battery cell manufacturing (Li Ion and future developments like Sodium Ion and Solid State) with an outlay of about \$2Bn.

At the same time, higher tariffs have been imposed on imported components and EVs to attract investments from domestic and foreign firms to India's large potential market, with PLI to offset

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startup costs. However, there are concerns that this could lead to a high-cost structure hurting global competitiveness.

An expanded subsidy scheme for customers (FAME3) is expected to be announced in February 2024. It will focus on E2Ws and buses and provide an upfront subsidy on the purchase price. Eligibility criteria will include local content norms.

Analogously, in the USA, the IRA intends to provide subsidies to customers and incentivize domestic manufacturing and value addition.

The full impact of these policies will be known in the next few years. In India for example, the FAME program has led to some complaints of wrong declaration and incentive claims by a few manufacturers resulting in suspension of their incentive payments. The first PLI claims are being processed and there are instances of shortfalls in achieving committed investment and output goals and delays in the release of incentive payments. Resolving such problems will be crucial for a smooth ramp up of investment and capacities.

The EV markets in the USA and India have different product priorities and price points with little overlap. India has the potential to develop into a global hub for E2Ws, E3Ws and small E4Ws (passenger and commercial) at low to medium price points. US manufacturers seem to be focusing on high end EVs at present. Only Tesla has plans for a mid-priced model at about \$20,000 for entering India.

India and the USA can however work together in overcoming some of their shared challenges. One area of mutual interest is raw materials mining & refining, and components for EVs. While current technologies are dominated by the Chinese, the focus could be on next generation technologies in materials, batteries, motors, and power electronics. Collaborations at the University level for specific research programs could provide benefits for all involved.

### **Concluding Remarks**

Though the US and Indian EV markets are evolving differently, they face similar challenges. A collaborative approach to address them – especially for regulations, incentives, supply chains and technology development – can prove beneficial to organisations in both countries.

**Rajendra Bhinge** | Chairman of Antennae Ventures Pvt. Ltd.

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## Interview with John McElroy: Part 2

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*Bob:* Welcome back to Plugged In. Let's pick up where we left off in the interview published in our January edition. We were speaking about the current state of EV adoption and how in your view it was going to take longer than predicted to achieve the government and OEMs' objectives.

### Question 1

*Bob:* When do you believe that EVs will represent 50% of sales of new vehicles in the US? Do you believe the Biden objective of 2030 is likely to be achieved?

*John:* Given the many variables that we discussed last time, including macro and micro economic conditions, geopolitical considerations, whether government support will continue and, if so, at what level, progress in reducing costs of EVs, etc., it is impossible to predict with any certainty. However, I don't believe that it will be accomplished by 2030. I believe that 2024 and 2025 will be difficult years for the transition under the best of circumstances, with the OEMs continuing to incur significant losses and experiencing lack of robust EV sales. However, I believe that starting in 2026, the tide will begin to turn with significant sales demand, losses materially diminishing as some OEMs reach scale, critical charging infrastructure increases, and vehicle prices decline. I believe that things will improve markedly toward the end of this decade in terms of customer acceptance.

By the 2025-2026 timeframe, we are going to have 2nd generation batteries, the costs are going to come down, the ranges are going to expand, the charging time is going to come down. We are also going to see a much better situation with public charging than we do today and that's going to start to change a lot of minds, or maybe not change minds but people saying yeah, I was looking for this to happen and now I'm ready to get an EV. So, what I wrote in 2018 about what I thought was going to happen, pretty much happened. As I look toward the next five years, I think the industry is really going to struggle. 2024, 2025, 2026 – very difficult times. They're going to be losing money but in 2027, 2028 I really see the hockey stick inflection happening where EVs really start to take off in terms of sales and profits for the automakers.

Finally, I think there is one technology once it is generally available that will be a game changer – bi-directional charging.

### Question 2

*Bob:* What is bi-directional charging and why do you think it will be so important in terms of customer adoption?

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*John:* The EV owner plugs in his/her EV at home at night and you fill up the battery with cheap electricity when rates are low and then during the day, say when you are at work or even at home, you sell electricity back at high rates to the grid by a converter system embedded in the EV charger. And so, you become an arbitrageur of electricity. And, there's different studies and the numbers are all over the map on this but in the end, you make money by arbitraging this electricity. It can also be used to supply electricity from the EV battery to the owner's home. And in some cases, it looks like you may not have an electricity bill at the end of the month and so you are essentially driving for free, at least from a fuel standpoint. And so, I think it's possible that once all EVs have bi-directional charging capability, the case for buying and driving an EV will be indisputable. I believe Hyundai and Nissan's cars already have this technology. Tesla's, interestingly, do not because Elon sells powerwalls and he wants you to buy those, not use your car to do that. So it may be sometime by the end of the decade or early 2030's, EV sales increase exponentially.

### **Question 3**

*Bob:* What are your views regarding the future of the EV start-ups? Are they likely to succeed?

*John:* There has been an amazing change. If you go back just 2 years ago, EV stocks were the darling of Wall Street. There was the fear of missing out; everybody piled on. Companies like Rivian, who had never built a vehicle, had a higher market cap than General Motors or Ford, which was mind blowing. So did Fisker's, so did...I mean fill in the blank. Now their stock prices have all crashed and they are running into real problems in getting capital. Sources of capital are far more leery of EV right now, in light of higher interest rates and the like. The capital has not completely dried up but it largely has. And what the other start-up's failed to remember, or just ignored, is that Tesla lost money for a decade and the only reason it was able to survive is that Elon Musk has the uncanny knack to pick up the telephone and say "hey guys, I need another \$2 billion" and he gets it that afternoon. Nobody else can do that. I mean, nobody. And so, all the legacies sort of laughed when Tesla was struggling through production hell because, even Mary Barra said, wait until we get there, we'll show these guys how to do it because we've got a history of being able to launch cars.

Now, even all the legacies are struggling on all of this. And so, I think start-up's are largely not going to make it. Tesla already has. They've turned the corner. Rivian, I think, will make it. They've got their sugar daddy, Amazon, with \$100 million worth of orders for their vans. They are getting orders from others now. Amazon lifted their exclusivity rule on them. They've got a 2nd generation product and plant on the way. They are burning through cash but it looks like they

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might be able to hold on for another 2 to 3 years, when as I mentioned earlier, I think we are going to see the hockey stick happen with electric vehicles.

Lucid may make it as well because its largest investor right now is the Saudi Sovereign Investment Fund and I don't think they are going to allow Lucid to go under because they've made such a big bet on it. They've also enticed Lucid to build an assembly plant in Saudi Arabia, which, I think, is a hugely bad thing to do, but if it keeps the capital flowing it's probably a smart move. So the other start-up's, I don't think they will have much of a chance.

In summary, the difficulty in obtaining critically needed capital and slowdown in consumer adoption in the short term will result in most of the EV start-ups failing, in my view, with the possible exceptions of Rivian, which is backed by Amazon, and Lucid, backed by the Saudi Sovereign Fund. I believe the balance of the start-ups will not survive.

#### **Question 4**

*Bob:* In your view, will the established OEMs be able to produce competitive EV vehicles?

*John:* The legacies will struggle but they will probably figure out how to do this, i.e., making EVs at a profit.

I've always liked GM's strategy. They've developed what they call the Ultium Platform and the Ultium Battery Pack. Essentially, you have this skateboard chassis and you can drop any kind of body style that you want on it. It can be a sedan; it can be a crossover; it can be an SUV; it can be a pick-up truck; but the guts of each of those vehicles pretty much use the same key components. So, even if you do spread it across multiple models, the battery pack, the motors, the inverter, the power, electronics, everything else is pretty much shared. And, that gets you the scale that you need.

#### **Question 5**

*Bob:* You didn't mention the technology problems being experienced by the OEMs as a material factor impacting consumer adoption. For example, the software quality problems being experienced by the new electric Chevrolet Blazer, which prompted GM to instruct its dealers to stop selling the Blazer. What are your thoughts?

*John:* It is not uncommon for there to be a period of working out the bugs in new product offerings. This is particularly true when you are dealing with a radically different product technology. The OEMs have historically been successful in quickly and efficiently remedying the problems. I think that will likely be the case with EVs.



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## Question 6

*Bob:* What about the Chinese EV manufacturers? Do you believe that they will succeed and how do you assess their intentions and ability in entering the U.S. market?

*John:* It's a fast moving story here. You know, as far as China goes, Europe is the canary in the coalmine because Europe has a much lower tariff, 10% tariff on imported vehicles. Although the political environment in the EU is changing to be more restrictive of Chinese imports, so far the Chinese have found the EU markets accessible. There has been a lot of talk of raising import tariff on Chinese cars in the EU and I believe that will probably happen. But, you know, what I think, keeping an eye on what happens in Europe is probably going to be a good indicator of what happens here.

But in fact, the big worry for the Chinese coming to America may not be with EVs. It might be with internal combustion vehicles because since COVID and the chip shortage, car prices in the United States have gone up 30% - 30% in a three-year period, even less than 3 years and that has taken literally millions of households out of the new car market. In fact, people are struggling to find even a used vehicle that they can afford because as we've priced out lower income or even middle income families from the new car market, that's left wealthier people to buy vehicles and the vehicles they buy are more expensive so even when they come off lease in 3 years, or whatever, they're more expensive than what most people can afford and so that really opens the door for the Chinese. You know you can buy a very nice sedan, Chinese-made sedan, meet all the emission standards, fuel economy standards, safety standards for \$14-15,000. So even with a 27.5% import tariff, you could still, theoretically sell them in the American market for under \$20,000. There will be buyers for that. There will be dealers who will say yeah, I'd love to get that franchise. Ironically, the car companies most threatened by a move like that would be the Japanese and the Korean automakers because the Americans have largely abandoned passenger sedans of any kind and the only ones left playing in that segment right now are the Japanese and the Koreans. They would actually be under the most threat. Now, having said that, NIO, for example, a Chinese automaker that sells premium cars, says it's going to have an EV in the American market by 2025 at the latest and it's not going after the lower end of the market. Although I have never driven a NIO, based on all the reports that I've seen, their cars are terrific. They've got a headquarters somewhere in southern California. So, they will be coming into the market.

The one to really keep an eye on is BYD which has out-Tesla'd Tesla. It out sells Tesla, at least in China. I don't know if it will do it this year, but certainly, next year it will surpass Tesla in electric vehicle sales. It's highly vertically integrated even more vertically integrated than Tesla. From

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everything that I've seen regarding BYD, (I have been in their cars even though I haven't driven them) they are as good as anything in the world and I personally believe the growth rate that BYD is going through would suggest the possibility of it being the biggest car company in the world sometime in the next decade.

I think there is no question that the Chinese will come into the U.S. market. Whether they have to just absorb the import tariff, whether they do a CKD or completely knock down an assembly where they bring in components from China and are able to avoid the 27.5% import tariff, even if they may not qualify for the \$7,500 tax credit. In addition, they are looking at using Mexico as a backdoor into the U.S. market by building vehicles in Mexico and then as part of the USMCA, gaining access to the American market.

*Bob:* Thanks again, John. Very much appreciate your insights and candor. I look forward to discussing your broader perspective of the China-US trade relationship during our next session.

## A Second Look at the Second Look

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As you may recall, in the March, 2023 edition of *Plugged In*, I wrote an article under the heading "A Second Look," questioning whether the criticism of Toyota's, at that time, contrarian multi-path strategy of pursuing hybrids as well as EVs in contrast to the "all in" EV strategy of most other OEMs, was justified. I noted that an article appearing in the *Wall Street Journal* entitled, "Toyota Needs a New EV Roadmap" was representative of the attacks on Toyota's strategy. In sum, the *Wall Street Journal* article argued that Toyota's multi-path strategy was a serious miscalculation. The criticism continued in an article in the June 2023 edition of the *WSJ* entitled, "Toyota Boss Faces Pushback Over EV Strategy in Shareholder Vote."

In that [edition of \*Plugged In\*](#), after reviewing the numerous obstacles and challenges to adoption in the near and medium term (e.g. availability of raw and processed materials, uncertainty regarding adequate grid capacity and charging infrastructure, etc.), I concluded, "it seems to me that when one considers the many material challenges and risks to the aggressive timeline for full scale EV transition, Toyota's strategy may well prove the better strategy in the long run."

One year later, it appears that the pendulum has shifted materially in Toyota's favor, as illustrated by the following two articles. It now appears that Toyota was on to something with its multi-path strategy. In a February 6, 2024, article appearing in the *Wall Street Journal* entitled, "[Toyota Cashes In on Booming Hybrid Sales](#)", the author reports that Toyota had forecasted a \$30.3 billion net profit for the fiscal year ending in March 2024, largely due to higher sales of hybrid

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vehicles in all of its major markets. Toyota projects the upward trend in hybrid sales will continue with hybrid sales increasing from 3.4 million in 2023 to 5 million by 2025.

In a second article entitled, "[GM Went All In on EVs. Dealers Say Buyers Want Hybrids](#)" appearing in the January 29<sup>th</sup> edition of the *Wall Street Journal*, the author reports that "Dealers who serve on the advisory committees to the automaker have urged executives in several recent meetings to add hybrids to GM's lineup. ...the dealers said they expressed concern that more customers are looking for a middle ground between conventional gas-engine cars and EVs, which are more expensive and require regular charging."

Ford Chief Financial Officer, John Lawler is quoted as saying, "With EV adoption slower, hybrids are going to be a bigger part of the business."

While benefiting from the sales surge in hybrids, Toyota continues to invest in its EV capabilities. It was recently announced that Toyota is investing an additional \$1.3 billion in its Georgetown, KY factory. Toyota will build its three-row, all-electric SUV in Georgetown and, in addition, the factory will house a battery pack assembly.

In sum, although Toyota's electrification roadmap was not as robust as its competitors, given the lag in market adoption, it appears that it will not suffer as a result. In fact, it appears to be profiting. Whether it was good strategic planning or just luck, it looks like Toyota will emerge as a winner in the race to provide the consumer the right product at the right time.

Moral of the story – sometimes it pays to defy conventional wisdom.

**Bob Weiss** | Of Counsel and Co-Chair, EV Initiative

*To learn more about our EV practice, visit our website at <https://www.dickinson-wright.com/practice-areas/electric-vehicles?tab=0>.*

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