ELECTRIC VEHICLES

E-MOBILITY: KEY TRENDS AND REGULATORY OUTLOOK IN ELECTRIC VEHICLES

ARTICLES INSIDE

- EVs: Affordability and Desirability
- Policy and Regulatory Environment
- Electric Vehicle Charging Infrastructure
- Telematics: The New Frontier in AutoTech
- Collaboration and Acquisitions among automakers
- Commercial Contracts for EV Industry
- Tax on Lithium-ion Batteries

Lakshmikumaran & Sridharan attorneys

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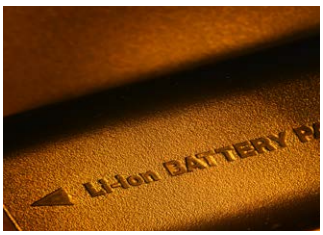
Lakshmikumaran & Sridharan is a full-service law firm based in India. The firm has 14 offices and has over 400 professionals specialising in areas such as corporate & commercial laws, dispute resolution, taxation and intellectual property. Over the last three decades, we have worked with a variety of clients – start-ups, small & medium enterprises, large Indian corporates and multinational companies. Our professionals have experience of working in both traditional sectors such as commodities, automobile, pharmaceuticals, petrochemicals and modern sectors such as e-commerce, tech, big data, and, renewables. We combine our knowledge of law, accounting, finance and technology with industry experience to design innovative legal solutions for our clients.

CONTENTS

FEATURES



FROM THE DESK OF THE MANAGING PARTNER

Dear all,

Lakshmikumaran & Sridharan (LKS) has developed specialisation in various branches of law since its inception in 1985. Over the last 37 years, the core practice verticals continue to be Tax, International Trade, Intellectual Property, Corporate and Mergers and acquisitions (M&A), Dispute Resolution, Regulatory and Competition. With the emergence of newer sectors, we too have expanded into niche practice areas, such as Web 2.0/3.0, Digital Assets, Electric Vehicles, Data Protection, Food, Environment, Employment and more.

LKS believes in sharing the knowledge and insights, the firm gathers through research and on-ground experiences through knowledge series delivered through newsletters, lectures, workshops, whitepapers and articles on varied subjects, highlighting important legislation and judicial pronouncements while deliberating on industry impact. We have been receiving encouraging comments and compliments for the articles and the lectures delivered by our team.

Our focus has been to understand key industries from a holistic perspective while understanding the application of different laws in them. The amalgamation of legal expertise and industry knowledge brought by our professionals is an asset that helps us to provide cutting edge, customised and value-driven solutions to our clients.

Born out of these initiatives, is our knowledge series "LKS - IN FOCUS" that we started last year. This publication intends to cover our thought leadership in different sectors and issues revolving around those sectors through incisive articles. Our inaugural publication of "LKS – IN FOCUS" focused on Agritech that was highly appreciated by our readers across the ecosystem. .

In continuation of our idea of building an informed community, the latest issue of "LKS - IN FOCUS" provides a 360-degree view of the E-mobility sector that seems of be the future of automobiles in the country.

The concept of Electric Vehicles has evolved with time and is now gaining eye-balls due to technological advancements, making the sector visible and mature enough to match the performance of its Internal Combustion Engine (ICE) counterpart.

The economics around Electric mobility has improved drastically in the past few years due to a better understanding of its use case. However, the timeline for mass adoption of Electric Vehicles is still far from being achievable.

The EV story in India has evolved from the time when EV parts were purchased from China and assembled in India to the present scenario where technological advancements contribute to EV manufacturing within the country. The revolution for E-Mobility is gaining momentum largely due to evolving consumer behaviours, an increase in impetus towards environmental awareness and reducing dependence on non-renewable energy sources. According to a statement released by Mr Nitin Gadkari, Minister of Road Transport and Highways of India, *'The Centre intends to have an electric vehicle sales penetration of 30 percent for private cars, 70 percent for commercial cars, 40 percent for buses, and 80 percent for two and three-wheelers by 2030 by providing various incentives, which are likely to drive the growth of EV market in India'.*

India is the fourth largest automobile market in the World and is also home to a few of the most polluted cities in the world. Further, a large number of Indian users are dependent upon two-wheelers. All these factors collectively provide for a strong push toward Electric vehicles. However, the lack of proper infrastructure and charging mechanism – along with price mismatch – has side-lined this sector from mass adoption.

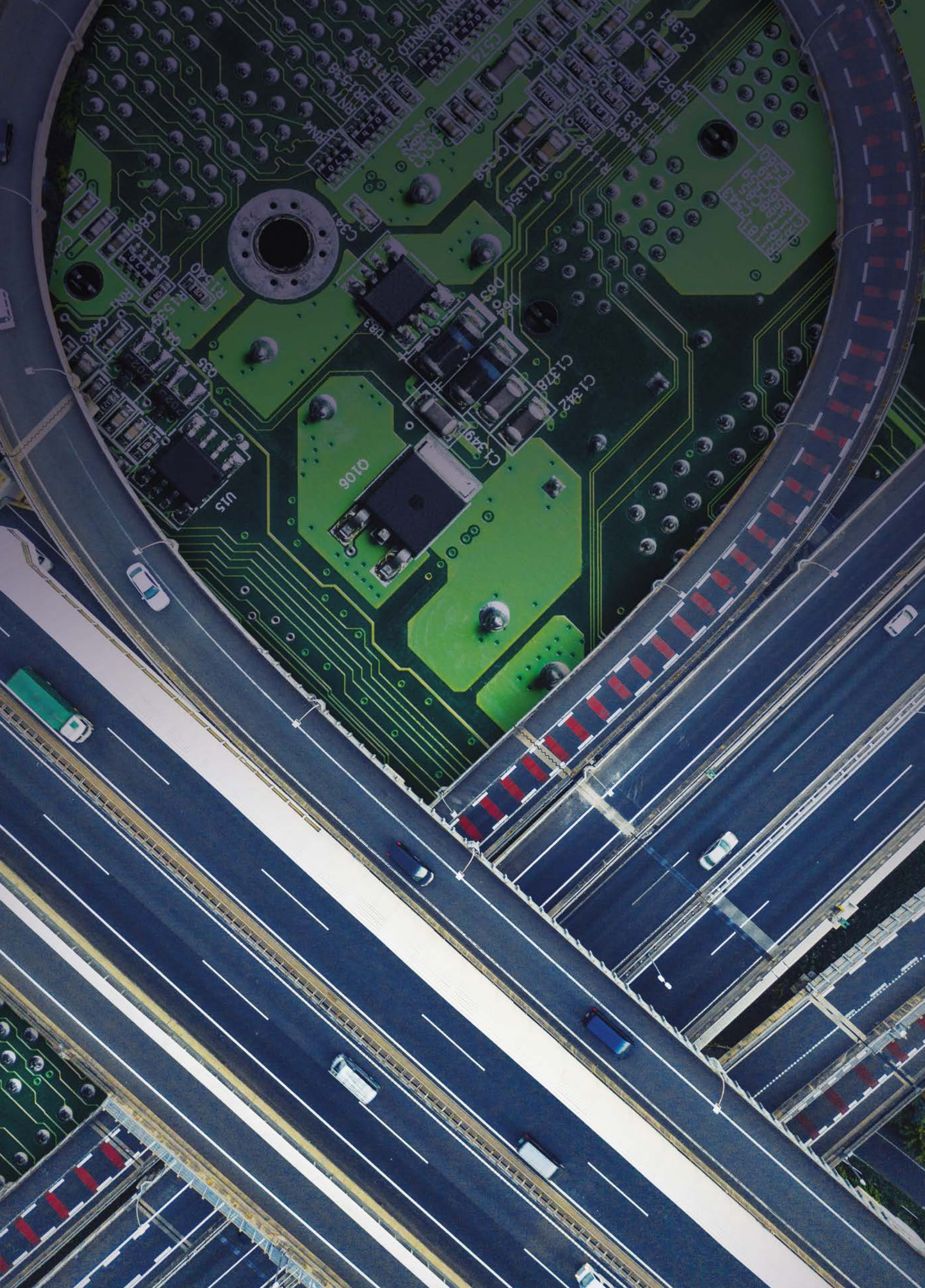
Our selection of articles will provide the readers with a comprehensive understanding of the Electric Vehicle sector, covering the history as well as the evolution of this market.

The current edition will provide the readers with a detailed understanding and analysis of the E-Mobility space, adoption of EVs among consumers, factors towards EV adoption and growth, recent policies introduced by the Central and State government in the EV sector, Infrastructure surrounding EVs manufacturing and charging facilities, role of technology/telematics towards the development of EVs, outlook of the investors and laws and regulations impacting the EV sector.

Other aspects, such as collaboration with existing auto players, commercial transactions and legal issues in the EV space, Customs and GST aspects around batteries and other EV components have also been covered in this edition.

We are thankful to all the partners and associates at the firm who have contributed to this edition. Last but not the least, our in-house edit, design and media teams deserve acknowledgement for their contribution to turning this edition into a reality.

Regards and best wishes,
V. Lakshmikumaran
Managing Partner
April 2022



FEATURE

Electric Vehicles: Affordability and Desirability

L. Badri Narayanan, Sarang Dublish and Aman Singhal

Recent Developments

Xiaomi, a Chinese smartphone maker has recently announced its plans to enter the Electric Vehicle business with a total investment outlay of USD 10 billion.

Mahindra & Mahindra Limited, an Indian multinational automotive manufacturing corporation, will make fresh investments to the tune of INR 3,000 crores on its electric vehicles business in the next three years.

MoEVing (a start-up engaged in providing technology enabled electric mobility solutions for urban last mile delivery) has recently tied-up with Hero Electric to accelerate adoption of affordable EVs, with plans to convert 100,000 internal combustion engine-run two-wheelers to EVs in the next five years.

Amazon and Flipkart have partnered with Indian EV firms such as Mahindra Electric, Hero Electric and Piaggio to adopt electrification of their last-mile delivery fleets in India.

Hero MotoCorp, India's leading Internal Combustion Engine (ICE) 2W manufacturer, has recently announced its entry in the electric vehicle segment by March 2022.

The company has recently invested INR 420 crores in electric scooter maker Ather Energy.

Gravita India Ltd., India's largest battery recycling company, is planning to enter the recycling business of lithium-ion batteries for electric vehicles.

Triton Electric Vehicle, a US-based EV manufacturer has executed an MoU with the Govt. of Telangana to set up a new manufacturing unit for electric vehicles. The company

ARTICLE IN FOCUS

The EV story in India has evolved from the time when EVs were primarily parts procured from China and assembled in India, to present times where technology plays a key role in EV manufacturing in India. This evolution has been largely due to changing consumer behaviour and outlook, namely, affordability and desirability towards EV-2W segment.

There has been a rapid surge in EV manufacturers in India that has not only influenced the EV consumer space but has encouraged other players to enter the market and bring innovative products.

EV players have given an impetus to the Government of India to incentivise the EV space and most importantly, they have validated the electric vehicle story in India.

What are the key considerations for enabling EV-2W adoption? What are the predictions about EV market growth? Are EV-2W closer to smartphone than an ICE vehicle?

Major trends of the automotive industry are now shifting towards digitalisation and are using vehicle telematics solutions that are transforming vehicles. This Article throws some light on the various factors that have a bearing on the EV growth story of India.

proposes to make an investment to the tune of INR 2,100 crores.

Hero Electric is currently looking to expand its production capacity with a target of 5,000,000 units in the next five years. The company will make operational production capacity to 500,000 two-wheelers at its facility in Ludhiana by mid-2022 in the first phase.

Hero MotoCorp Ltd. is investing INR 420 crores in electric scooter maker Ather Energy, at a time when India's largest two-wheeler maker is readying its own product for the local EV market.

Back in 2007, two to-be engineers joined IIT Madras with a common idea to build technologies for electric products. Both of them believed that technology could be a strong disruptor in the energy segment. Later by 2013, they started analysing the electric two-wheeler market in India. Their love for tinkering with technology led them to internships with big automobile and electric maestros such as BHEL, Ashok Leyland and General Motors.

Having done some research and work about EVs in India and China, along with developments in battery technology, they decided to develop a battery pack. These young enthusiasts were keen to understand how electric vehicles fared in India. **At that time, EVs sold in India were primarily assembled here, using parts procured from China. Products were cheap, with a starting price of USD 500. However, such products had a history of low performance and poor battery charge levels due to use of inefficient lead-battery sources. The experience with those EVs was underwhelming and frustrating, resulting in sub-par EV acceptance among Indian consumers. The numbers of units sold fell drastically from 100,000 units in 2011-2012 to 42,000 in 2012-13 and 21,000 in 2013-14[1]. It is interesting to note that early buyers were quite elated with the thought of eco-friendly green vehicles and lower total cost of ownership.**

With this background, the young engineers approached various buyers to understand their interest in using a far superior electric scooter with a high speed, a powerful battery system, longer range and with good storage of charge. The caveat was to support the 'Premium' attached

to their scooters (having a price gap of ~30-40% higher than competing petrol-powered vehicles). Although still a concept on the drawing board, the belief that buyers would consider purchasing a premium product at a higher price drove the development of this idea. Enthused by the response they received from the industry, Ather Energy was started.

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Around the same time, another entrepreneur and his team were trying to understand the consumer's experience towards EVs in a totally different way. Belonging to India's largest two-wheeler manufacturing company, this entrepreneur was well aware of the average Indian's psyche of purchasing two-wheelers. From his vast experience in this industry, he knew that factors such as lower purchase cost, cheaper maintenance and product reliability influenced a buyer's decision. However, even with the right approach, the adoption of electric scooters failed due to a lack of government policies, an increase in global crude oil prices and fluctuation in US dollar conversion rates. Many players in the market could not sustain their businesses in these testing situations. With this context, the group began its venture in the electric mobility space and started to understand various factors that may influence a consumer's decision-making. In 2007, the group ventured into manufacturing electric-powered alternatives, called "Hero Electric". Tracing its origin from the "Hero" brand, Hero Electric is currently one of the largest players in the EV segment in India.

Meanwhile, Ather Energy's founders focused on what they were exceptional at – engineering. Traditionally, auto companies procure components from established component manufacturers and focus on vehicle engineering. However, in an EV segment, the components are still in a developmental phase. Considering this reality, **the Founders of Ather Energy were convinced with the crux of delivering a high quality product is the integration of component manufacturing with engineering.** This meant the development of in-house technology rather than waiting for manufacturers to catch up with production. This approach led to a longer period to build the product, but it was in line with how any new industry emerges. As engineering remained the core competence of the company, it deployed 80% of its capital (~USD 150 Mn) into building its own Platform, Software, Management Systems, Components and Charging Infrastructure. This resulted in the creation of fast and intelligent scooters – the Ather 450 and the Ather 450X, priced at ~USD 2,000.

ATHER

Ather Energy has recently expanded its operations by setting-up a manufacturing hub in Hosur, Tamil Nadu. The manufacturing facility has a capacity to produce 120,000 battery packs and 110,000 scooters annually. The company also plans to expand it EV charging operations by setting up DC charging stations across major cities of India.

The brand has outlined an investment of INR 650 Crores in the next five years to enhance operational efficiency and production capacity.

On the other side, the Hero Electric team built their own range of products in a similar fashion on a shoe-string budget. Frugal, prudent and patient, the team put together a series of products ranging from USD 650 to USD 1,200 that would hit the bulge of the market. **Hero Electric focused more on developing a hyper local EV experience rather that spending on marketing and promotional activities.** The group focused on providing a compact electric vehicle that would complement the Indian lifestyle of a user at an appropriate price, offering a comfortable ride, with a reliable product, access to better maintenance and availability of charging infrastructure.

Additionally, this group has also tackled operational challenges such as availability of charging stations en-route by partnering with small shop owners or *kirana* stores around its dealerships.

To cater its customers and take care of their day-to-day requirements, the company has trained over 4,000 local mechanics to provide services for its EVs in case of break-downs.

With this in mind, Hero Electric has recently announced that the company aims to train over 20,000 roadside mechanics across the country in the coming three years as a part of its plans to instil confidence in buyers who opt for green mobility.

These companies have not only influenced the EV consumer space in India but have encouraged other players to enter the market. These companies have given an impetus to the Government to incentivise the EV space and most importantly, they have validated the electric vehicle story in India.

The Indian EV adoption will see the following two segments emerge.

Premium EV Segment	Mass Producing EV Segment
• Limited EV models • High price tags with lower volumes and luxury features • Better technology and high performance/ range	• Multiple EV models (availability of multiple options) • Lower-to-moderate price tag, acceptable to price-sensitive customers, with larger sales volumes • Easy-to-use and non-technical vehicles

The Indian EV 2W market remains largely driven by mass and low-cost mobility segments at the moment. However, India needs both, premium and mass market consumers, to achieve success in its EV story.

Furthermore, with increased sales of EVs, advanced engineering, development of

technology and improvement in associate services, a steady EV market will be established. With easy accessibility of EVs and associated technology, the distinction between premium and mass segment EVs may reduce.

The Value of Experience

The Indian Automobile Industry has seen significant evolution since 1990s and continues to do so with changing customer expectations, types of products and technologies. **It is important to note that the Indian auto sector has helped the economy to create multi-dimensional growth in urban and rural markets**. The sector has robust sales in various segments such as two wheelers, three wheelers and consumer vehicles such as cars and SUVs. Presently, India is the fourth largest automobile market in the world[2]. However, due to the Covid pandemic, Indian automobile market sales have tumbled to 18.62 million vehicles in FY 2021, which are the lowest sale numbers reported since FY 2015.

In terms of market segment, two wheelers (2Ws) continue to remain the linchpin of the industry, constituting ~81% of the ICE vehicles sold in FY 2021. On the contrary, the four-wheeler (4Ws) market in India constitutes ~14.5% market share of the total vehicles sold in FY21[3].

In India, 2Ws are used both, for personal mobility purposes as well as for commercial operations, such as performing last mile delivery services for food and couriers. The enormous share of 2Ws in the automobile industry and its multifunctional use clearly highlights the potential for the adoption of EVs. At present, EV penetration levels in India are nominal, constituting slightly above 1% of the total vehicles sold in FY 2021. It is expected that this number will continue to change favourably in the short and medium terms.

Segment[4]	Sub-segment (Use)	Units sold in FY21	Units sold in FY20
E-2W	Passenger (B2C) and B2B	1,43,837	1,52,000
E-3W	Passenger (B2C) and B2B	88,378	1,40,683
E-4W	Passenger (B2C) and Commercial	4,588	3,000

In fact, many factors make EV a preferred alternative for mobility, including climate change concerns such as lower greenhouse gas emissions and better air quality; reduced dependence on crude oil and lower death ratio caused due to air pollution.

The Government has introduced various policies and regulations supporting the adoption of EVs in India. While it is difficult to accurately assess the pace of EV adoption and market penetration of EVs, the The 'Policy Think Tank of India' - NITI Aayog has targeted 70% of all commercial cars, 30% of private cars, 40% of buses

and 80% of two-wheeler and three wheeler sales by 2030 from electric vehicles.

Key Considerations to Enable EV-2W Adoption

We believe that the adoption of EV-2Ws would be in a phased manner followed by adoption of electric mobility in three-wheelers, four-wheelers and commercial buses. From a consumer's perspective, there are many other drivers for the adoption of EVs in India.

- **Performance comparison:** ICE vehicles offer superior performance in terms of longer driving range and higher top speed.

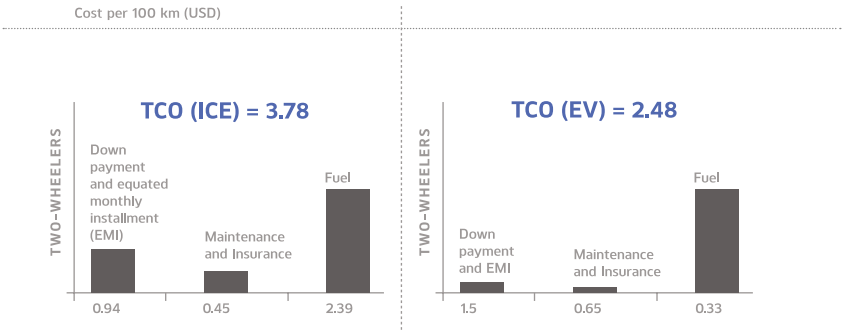
- **Upfront purchase price variation and parity on Total Cost of Ownership (TCO):** The problem of higher upfront cost hampers the adoption of EV-2Ws. However, for the discerning Indian consumer, the upfront cost of EV-2Ws (lower to mid-segment vehicles) is similar to the purchase cost of an ICE vehicle.

The inflection points for a customer to make a purchase decision in favour of an EV could be where the TCO is lower than that of an equivalent ICE vehicle. This can only be achieved after the establishment of a robust ecosystem of Li-ion batteries, EV components, lower taxes, purchase subsidies and accessible charging infrastructure.

Industry Trends

Development in battery technologies and introduction of advanced battery management systems has reduced the price of batteries (*mostly Lithium – Ion batteries*) drastically in the last decade. Many start-up entrepreneurs believe that advancement in technology of battery manufacturing and achieving economies of scale will be the major factor towards adoption of EVs over ICE equipped vehicles. Additionally, skyrocketing prices of crude oil has forced consumers to look for alternate mobility solutions.

TCO comparison of Electric 2Ws versus traditional ICE vehicles [5]



The above comparison between electric vehicles and traditional ICE vehicles is before the additional incentive provided by the DHI under FAME-II.

On June 11, 2021, the government had made a partial modification of the EV governing scheme (FAME II) by increasing the demand incentive for electric two-wheelers to INR 15,000 per KwH from the earlier uniform subsidy of INR 10,000 per KwH for all EVs. With this amendment, the net TCO for an EV will further reduce due to lower purchase cost.

- **Lack of financing:** Currently, only a few players are willing to finance purchases of EVs as the financing ecosystem is still at a nascent stage. Bankers and financiers believe that the customer will default on repayment plans, as EVs are expensive. Consequently, realisation of loaned money may be difficult due to a lower market demand for EVs among consumers.

- **Reasonable Charging Infrastructure:** Expanding and improving charging infrastructure and facilitating ease of access for charging stations at public locations is critical for the adoption of EVs. Further, longer charging hours can be eliminated by using hybrid utilisation models such as battery swapping.

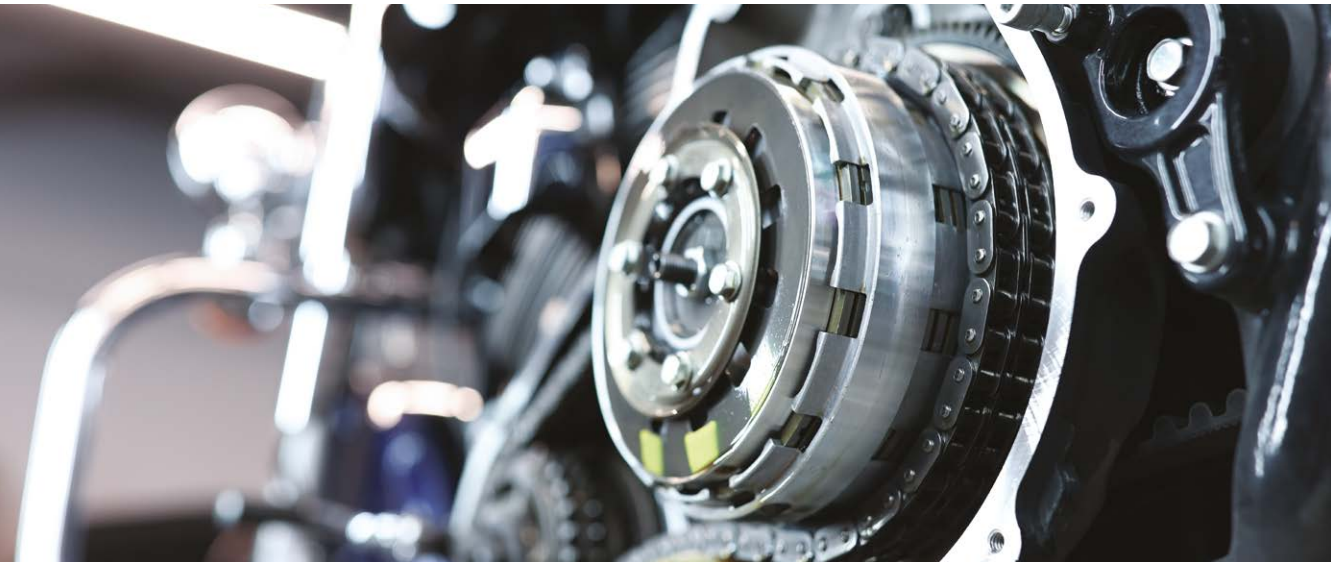
- **Government Incentives and awareness:** India has a large variety of motor transport on roads and has varied auto-segments, with the 2W category dominating the market. To foster the adoption of electrification requires EV policies and a series of incentives by the Government. At present, the government has introduced FAME-I and FAME-II scheme to incentivise EV adoption.

सत्यमेव जयते
Ministry of Heavy Industries
Government of India

Component stack-up of EV-2W. Are EV-2W closer to smartphone than an ICE vehicle?

An electric vehicle is fundamentally a different product when compared to an ICE vehicle.

An ICE vehicle is a complex machine due to transmission systems that has been refined over several decades. The presence of a large number of moving parts that wear down with use, often makes it quite complex to engineer and limits innovation. This also increases the cost of maintenance of an ICE vehicle.



The electric vehicle, with its simpler components, is really built over an electronics platform, powered by software. The battery is controlled by the battery management system (BMS) and thermal management system (TMS) whereas a motor controller regulates the motor.

On the contrary, an EV is a simpler machine that does not need any transmission and has fewer parts.

Here is a simple comparison of the parts and the inputs going into these vehicles.

Particulars	ICE	EVs
Total Moving Parts used	140–160	21–25
Total Wearing Parts used	20–27	09–12

Basis information available from public sources and discussion with Industry Experts

Beyond the components and peripherals, is the fact that the electric vehicle has been conceptualised differently than the traditional vehicle. The electric vehicle, with its simpler components, is really built over an electronics platform, powered by software. The battery is controlled by the battery management system (BMS) and thermal management system (TMS) whereas a motor controller regulates the motor. The other core components are designed around power electronics. Such a configuration places data and connectivity at the core of the machine.

The advantage of an electronic platform is that every parameter in the vehicle can now be tracked. Unlike an ICE vehicle, where several parameters are based on physical inspection or estimations, an EV can provide a whole host of accurate data. The on-board diagnostics can provide information about the number of times a battery has been charged, the rate of discharge of the batteries, the speeds at which the vehicle run, the performance of various components, accidents – if any, so on and so forth. Except for a few components that need physical inspection, a much clearer view of the vehicle is presented.

This allows for better evaluation for re-sale, maintenance and servicing.

Innovative Indian Minds – Providing full-stack EV solutions

ATHER

Ather Energy is an Indian start-up that manufactures electric vehicles and provides charging solutions to its customers. The company is presently working on a full-stack in-house approach to build its own battery pack and undertakes tech-development, such as developing an in-built display in the vehicle.

EULER

Euler is an automotive technology-oriented start-up focused on providing sustainable last-mile transportation by accelerating the transition from ICE to new-age EVs. The company focuses on solving last-mile logistics for e-commerce players.

It has a dedicated manufacturing and R&D facility to produce light commercial EVs (3W) along with automotive-grade lithium-ion battery packs. Presently, the company has partnered with players such as Big Basket, Blinkit (formerly Grofers), Ecom Express, Licious, Flipkart Supermart and Udaan.

Telematics in EVs

By creating vehicles that connect to the soon to be introduced 5G networks, a whole host of features open up for innovation. **Remote upgradation of software, application of software patches, trouble-shooting vehicle issues, theft protection by locking the vehicle and its components, shared mobility tracking and servicing can all be done remotely. With less wear and tear in the parts and better connectivity, maintenance is less frequent and can be provided remotely. At the same time, such connectivity reduces the cost of financing cost as the vehicle can be 'locked' on default. Finally, such connected vehicles allow for track-shared mobility.** These vehicles can be instantly connected with the smartphone, making these into extensions of the digital experience for the customer. **Added with home-charging as the pre-dominant form of charging, such an EV resembles a smartphone more than a traditional vehicle.**

Major trends of the automotive industry is veering towards digitalisation and are using vehicle telematics solutions that are transforming vehicles. While modern commercial and passenger vehicles are already integrated with mainstream telematics and driver assistance features, the current wave of digital connectivity is now rapidly progressing into E-2Ws. Some possible use of telematics in E-2Ws includes road and vehicle condition monitoring to notify the driver about possible risks and breakdowns, driver behaviour

analysis for insurance companies, smart helmets and theft protection systems along with vehicle health management to monitor engine health, tire pressure and battery health.

Our LKS | In Focus series on E-Mobility also covers an article on Telematics in this Sector. For details, please refer to our article on Telematics in this series,
"Telematics: The New Frontier in AutoTech"

Emergence of Unconventional Players

The evidence of new developments in the EV space is demonstrated by the fact that new entrants in the EV market are not necessarily auto makers.

Recent trends have shown that non-auto manufacturers or service providers intend to foray into the EV market such as Xiaomi (a smartphone maker), Ola (a cab aggregator), Apple (a multinational technology company) and many more. All these companies understand the psyche of an Indian consumer from a technology perspective and are presently innovating technical solutions for the EV market.

This bodes well for the industry in the long run. But as with all new industries, Government policies and incentives play an important consideration.

EVs – The Road Ahead

Adoption of electric mobility is not just limited to replacement of ICE vehicles, but also aims towards the greater good of clean energy and cost effectiveness in the long run.

The E-2W market is split into Premium and Mass segments and these segments require distinctly different approaches towards adoption. At present, government policies and incentives such as purchase subsidies for customers play a significant role in EV adoption. These policy measures apply to a wide range of EVs based on eligibility criteria including price, range and speed. Additionally, incentives for EVs are only available for vehicles with at least 50% components manufactured or sourced within India.

Due to the complex nature of EV subsidies, the intended benefit is still outside the reach of the end user. Many customers purchasing premium segment E-2Ws are unable to claim these subsidies since they are only available for E-2Ws with a price tag up to INR 1,50,000. Further, the eligibility of subsidy for mass segment EVs reduces due to range and speed criteria.

In addition to increasing government incentives for EVs, there is a need to focus on barriers to assimilation, such as performance and range anxiety, lack of financing, cost of ownership and shortage of charging infrastructure. To facilitate faster EV adoption,

many manufacturers and EV players are shifting towards innovative business models such as selling EVs online or through Direct to Customer showrooms instead of traditional franchisee-based business model.

The Indian Government is focused on E-2Ws and has recently increased the incentive limit for buyers on purchase of E-2W to INR 15,000 per KwH to encourage mass adoption of E-2Ws.

What does the Government have to offer?

A collaborative approach between the government and manufacturers is required to ensure affordable EVs to the Indian population. The Central Government and State Governments have understood demand-side incentivisation as a key step towards EV adoption. These incentives will reduce prices of EVs making them comparable to traditional ICE models. Such incentives along with lower total cost of ownership will drive the user's decision-making power towards EVs.

Moreover, these incentives may be weaned away over time due to increased economies of scale among manufacturers and reduced price of batteries due to advance engineering and technology which will bring greater upfront economic parity between ICE and EVs.

It is rightly believed that humankind has faced many disruptions and these disruptions are surrounded by uncertainties at the beginning. It cannot be denied that the adoption of electric mobility is poised to grow exponentially with

increasing awareness amongst customers together with innovative products being offered by EV suppliers. Undoubtedly, India's EV story seems to be at the crossroads of axial divergence and the future is indeed, electric!

Please refer to the next article in this series,
"The Policy and Regulatory Environment for Electric Vehicles in India"
for an overview of the governmental landscape in this sector.

L. Badri Narayanan is an Executive Partner at the firm. **Sarang Dublish** is a Joint Director at the firm. **Aman Singhal** is a Senior Associate at the firm.

ENDNOTES

1 Sharmistha Mukherjee, How India's E-Vehicle Dream Crashed into the Subsidy Wall, https://www.business-standard.com/article/companies/how-india-s-e-vehicle-dream-crashed-into-the-subsidy-wall-114082600021_1.html, (Accessed on February 11, 2022).

2 Nehal Bajwa, Running in the Top Gear, https://www.investindia.gov.in/sector/automobile, (Accessed on February 11, 2022).

3 Shanglia Sun, Sales of automobiles in India from Financial Year 2011 to 2021, by Type 2021, STATISTA (September 28, 2021), https://www.statista.com/ statistcs/608392/automobile-industry-domestic-sale-trends-india (Accessed on January 15, 2022).

4 EV REPOTER, https://evreporter.com/ev-sales-report-for-fy-2020-21-by-smev/ (Accessed on January 14, 2022)

5 Patrick Hertzke, Jitesh Khanna, Khushboo Kumar, Timo Moller, Gandharu Vig, The Unexpected Trip: The Future of Mobility In India Beyond Covid-19, MCKINSEY&COMPANY.COM (July17, 2020, https://www.mckinsey.com/industries/Automotive-and- assemblu/our-insights/the-unexpected-trip-the-future-of-mobility-in-india-beyond-covid-19. (Accessed on January 15, 2022)

FEATURE

The Policy and Regulatory Environment for Electric Vehicles in India

L. Badri Narayanan, Sarang Dublish and Aman Singhal

Policy Scenario

India's EV ambition started a decade ago, and now has less than ten years left to achieve the ambitious goal of 30% market share of electric vehicles by 2030.

Global economies and Governments are working towards promoting electric vehicles (EVs) primarily due to inherent benefits of improving air quality, enhanced energy generation and achieving a significant reduction in fuel dependence.

Aware of the benefits of alternative energy, the Government of India is proactively working towards large scale positioning of cleaner and efficient mobility solutions in the country. A rapid increase in global temperature has created a dire need to reduce the use of fossil fuels and associated emissions.

At present, air pollution in India is dangerously high, with 22 of the 30 most polluted cities in the world. India is also the third-largest contributor of carbon emissions in the World[1].

Global Context – The Transportation Policy of many countries includes the adoption of electric vehicles. The journey of assimilation of EVs in USA started in the early 1990s and has revolutionised transportation in the country due to a well-defined policy framework that enables start-ups such as Tesla. Apart from consumers' perception, the response to adoption of electric mobility further depends upon the country's capabilities, economic development, budget allocation and prioritisation of goals towards environmental conservation.

In Norway, the adoption and deployment of electric vehicles has been driven by the active support of the Norwegian government, starting with a policy introduced in 1990.

At present, Norway is the clear frontrunner in electric mobility with the highest EV market penetration across the globe. Annual

ARTICLE IN FOCUS

The push for assimilation of alternative energy for transportation is now a priority for all countries. Electric mobility, especially, proves to be a front-runner.

The Govt. of India has announced a slew of incentives and relaxations to encourage investments in e-mobility. Simultaneously, policies and regulations are being designed to enable ease of assimilation of electrified transportation.

The primary focus is to increase adoption of EV by showcasing incremental factors such as reduced cost of ownership, creating charging infrastructure, addressing climate concerns and many others factors through a robust and effective policy and regulatory framework will hasten the achievement of India's ambitious targets towards green energy and e-mobility.

sales of all-electric cars outsold the combined volume of all passenger cars with internal combustion engines (ICEs) in 2019[2].

Nitin Gadkari

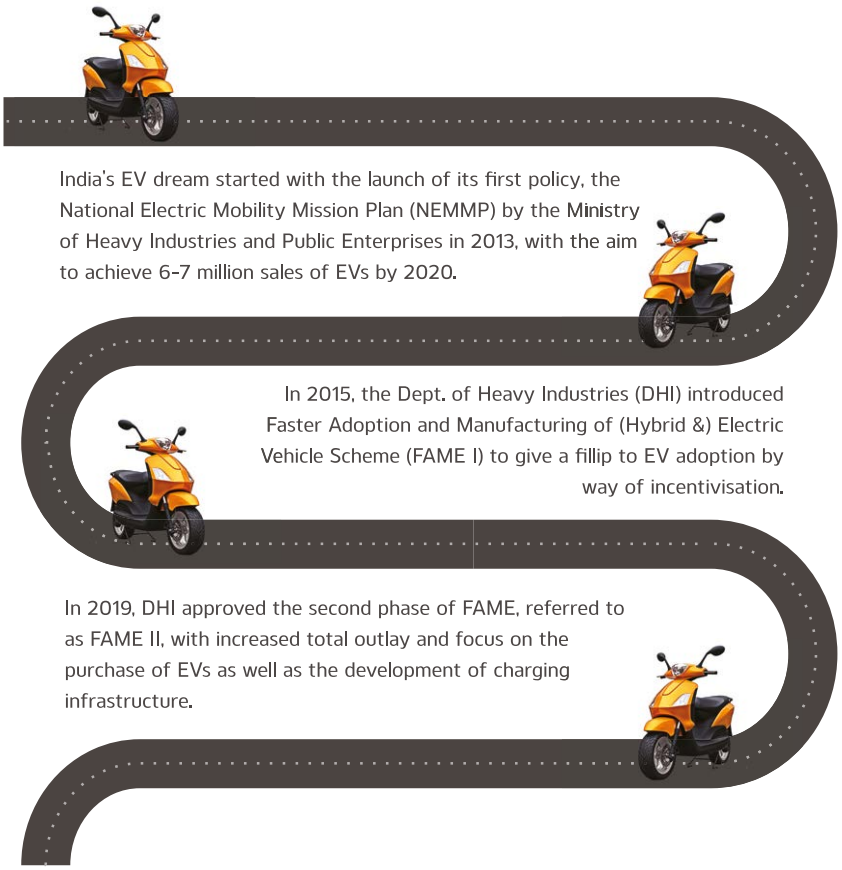
Minister of Road Transport and Highways of India

Expansion strategies for the EV market have increasingly been making headlines in recent years. The present Minister for Road Transport and Highways, Mr. Nitin Gadkari, has recently added that 'The Centre intends to have an electric vehicle sales penetration of 30 percent for private cars, 70 percent for commercial cars, 40 percent for buses, and 80 percent for two and three-wheelers by 2030 by providing various incentives, which are likely to drive the growth of EV market in India'.

The Indian Context

India has a large variety of on-road auto-segments compared to other countries, with the 2Ws category dominating the market. Considering India's large population, fostering a consumer preference and comfort towards electrification requires EV-friendly policies, which are tailored to India's needs.

Towards this end, the Govt. of India has announced a series of policies to promote EV adoption in India.



Policy Initiatives by the Government of India

NITI AAYOG

- The Cabinet has approved setting up of a National Mission on Transformative Mobility and Battery Storage, and the creation of a Phased Manufacturing Programme (PMP) for five years, to support the set-up of large-scale, export-competitive integrated batteries and cell manufacturing giga plants in India, as well as localising production across the entire electric vehicle value chain

BUREAU OF INDIAN STANDARDS

- Bureau of Indian Standards (BIS) has notified general requirements for EV charging, based on CCS & Chademo charging standards
- BIS to publish new charging standards in India this year vide Electrot Technical Department - 51

MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

- The Ministry allows registration of EVs without batteries to bring down the cost of 2W and 3W in comparison to ICE counterparts
- All battery-operated transport vehicles will be exempted from permit requirements
- Grant of driving licenses for the age group of 16–18 years to drive gearless electric scooters and bikes up to 4 kWh battery size

MINISTRY OF HOUSING & URBAN AFFAIRS

- The Ministry has amended model building by-laws and town master plans to assist provisioning of EV charging stations in private and commercial buildings

MINISTRY OF FINANCE

- To push the 'Make in India' initiative, the Govt. of India has increased customs duty on imported EVs, battery packs and other components

MINISTRY OF POWER

- No license for distribution of power is required to operate EV charging stations in India
- A phase-wise installation of charging infrastructure has been envisaged, to ensure the availability of at least one Charging Station in a grid of 3 km X 3 km in cities and one Charging Station at every 25 km on both sides of highways and major roads
- For inter-city travel, Fast Charging Stations are to be installed at every 100 kms, one on each side of the highways and major roads

E-Mobility – India's Policy Roadmap

At present, the total number of EVs sold in a year is miniscule compared to the overall automobile market. This number needs to be increased gradually, with improved customer perception of EVs through incentivised central and state level policies.

CENTRAL POLICIES

Key policies released by the Govt. of India to promote the adoption of electric mobility are as follows.

A. National Electric Mobility Mission Plan (NEMMP)

NEMMP marked the beginning of India's EV landscape in 2013, with a broad vision of EV adoption. The Plan was developed with a vision statement to:

- Encourage adoption of reliant and efficient EVs among consumers
- Creation of local manufacturing capabilities
- Development of technology to support ownership and the use of EVs
- Reduce dependence on crude oil for transportation by promoting EVs in India

Through the development of robust manufacturing capabilities, requisite infrastructure and technology, and increased consumer awareness, the government aimed to achieve a lucrative sale target of 6-7 million EVs by 2020. However, the presence of on road EVs today is far short of this target.

B. FAME-I

FAME was introduced to encourage faster adoption of electric and hybrid vehicles by offering upfront incentives to consumers, on the purchase of EVs. This policy also pushed for the establishment of necessary charging infrastructure. The first phase of the scheme was notified in 2015 with multiple extensions till March 2019, with a total outlay of INR 8.95 Bn.

Under FAME-I, a demand incentive is provided to consumers, to be availed at the point of purchase, and the same is reimbursed to manufacturers by the DHI. The scheme covers electric and hybrid technologies like Mild Hybrid, Strong Hybrid, Plug in Hybrid & Battery Electric Vehicles.

In addition to demand creation, FAME-I also focuses on R&D, technology development, pilot projects and public charging infrastructure.

FAME-I managed to create a significant buzz in the automobile industry and created an early foundation for India's EV ecosystem.

Through this scheme, awareness about electric mobility has significantly increased. Many start-ups have entered the EV space with developed manufacturing capabilities and increased technological growth. Leading industry players have also been quite optimistic and show an active interest in the overall EV ecosystem.

C. FAME-II

FAME-II is an expanded and improved version of FAME-I. This scheme was sanctioned with a total outlay of ~INR 96.4 Bn divided into three components, spread over a period of three years. The scheme offers subsidies to manufacturers, as well as consumers, to buy an EV at a reduced price.

Demand Incentives	Charging Infrastructure	Admin Expenditure
Provide upfront subsidies or a reduction in price to buyers in the form of reduced price to purchase EVs	To boost the availability and set-up of charging stations	For smooth operationalisation of the scheme through training, publicity, etc.

FAME-II covers all major vehicle categories – Electric buses, Electric 3Ws and Electric 4Ws, which can be used for commercial purposes, and the scheme applies to Electric 2Ws for personal use as well.

DEMAND INCENTIVE

FAME-II proposes to provide an incentive of INR 10,000 per kWh for Electric 2W, 3W and 4W EVs. This incentive was further increased to INR 15,000 per kWh for E-2Ws. For E-Buses, an increased incentive of INR 20,000 per kWh is proposed to encourage public transportation. The FAME-II scheme has a dual objective of specifying minimum speed and range as criteria to encourage the manufacture of higher performance products and retaining an upper cap on the vehicle price.

Segment-wise Incentives

Category	No. of Vehicles to be incentivised	Price Cap on Vehicle - INR	Demand Incentive (INR/KWH)	
E-2W	1,000,000	150,000	15,000	Subject to upper cap of 40% % of the / ex- showroom price
E-3W (including E-rickshaws)	500,000	500,000	10,000	Subject to upper cap of 20% of the ex-showroom price
E-4W	35,000	1,500,000	10,000	
E-4W (Hybrid)	20,000	1,500,000	10,000	
E-Buses	7,090	20,000,000	20,000	Subject to competitive bidding with an overall upper cap of 40% of the ex-showroom price

Great Expectations?

The policy entails a larger range of eligibility criteria for vehicles, including price, range and speed. Many EV manufacturers face challenges due to these comprehensive eligibility criteria.

A subsidy of INR 15,000 is only available for E-2Ws which have a price tag of about INR 1.5 lakh.

Further, subsidies are only available to limited EVs due to range and speed criteria.

In addition, the requirement to manufacture at least 50% of the components locally, poses a major challenge in certain situations.

CHARGING INFRASTRUCTURE

The availability of charging infrastructure is one of the key requirements to accelerate the assimilation of EVs in India, and the Government has allocated INR 10 Bn to set-up charging stations under FAME-II to facilitate this aim. The scheme also provides for one slow charger per buyer for every E-bus purchased and one fast charger for every ten E-buses purchased.

With this in mind, the Ministry of Power has issued various notifications to accelerate the assembly of charging stations, such as delicensing of public charging station, and installation of charging grids in mega cities and expressways[3].

STATE POLICIES

The Indian EV market varies significantly from state to state, depending on population demographics, rate of urbanisation, income levels and regulatory landscapes. Multiple state governments have rolled out EV-specific policies, offering policy incentives to Original Equipment Manufacturers (**"OEMs"**) and consumers in the form of capital subsidies, stamp duty (SD) reimbursements, reimbursements and concessions on electricity duty and end-use incentives.

State Governments have introduced these EV policies majorly to attract investment for establishing manufacturing/ industrial facilities.

Summary of EV State Policies

All major states have prioritised their respective EV state policies. These policies differ in terms of EV targets, demand incentives (benefits to consumers) and supply side incentives (benefits to OEMs and EV companies).

State	Targets	EV Incentives
Andhra Pradesh 	• 10 Lakh EVs by 2024 • 1 Lakh charging stations by 2024 (Slow & Fast) • 100% electrification of buses by 2029 (by 2025 for 4 major cities) • Attract investment of INR 300bn (with employment potential – 60,000 people)	• 100% reimbursement of road tax and registration fees till 2024 • Capital subsidy ranging from 10% to 35% towards purchase of fixed capital investments on manufacturing of electric vehicles and components • 100% stamp duty reimbursement on purchase of land • Reimbursement of electricity duty for five years • 100% reimbursement of net SGST
Bihar 	• 100% e-mobility by 2030 (2022 for e-rickshaws) • Attract investment of INR 25bn (with employment potential – 10,000 people) • Fast-charging stations at intervals of 50 km on state and national highways	• End-user subsidy based on types of EVs • Special incentive of INR 10,000 for Lithium-ion battery-based e-rickshaws • Exemption from road tax and registration fees • 25% capital subsidy on equipment and machinery for first 250 commercial public EV charging stations
Delhi 	• EVs to account for 25% of all new vehicle registered by 2024 • E-buses to constitute 50% of all new stage carriage buses procured (Period: 2019-2022) • Encourage reuse and recycling ecosystems for EV batteries	• Purchase incentive of INR 5,000 to INR 10,000 per kWh for E-2W/ E-4W (additional INR 5,000 on E-2W as scrapping incentive on de-registration of old ICE vehicle) • Purchase incentives on other EVs as well • Waiver of road tax and registration charges for EVs • Interest subvention of 5% on loan for E-Autos, E-rickshaws, E-carts and Goods Carriers • Up to INR 6,000 grant per charging point for first 30,000 points • 100% reimbursement of SGST to Energy operators for purchase of advanced batteries for battery swapping stations *Recently, the Govt. of Delhi is planning to notify an Aggregator's Policy, making it mandatory for ride hailing and delivery services industry to ensure at least 10% of all new additions to 2W fleets and 5% of all new 4W fleets are electric*

State	Targets	EV Incentives
Gujarat 	• 1.1 Lakh E-2W, 70,000 E-3W and 20,000 E-4W by 2024	• Exemption from registration charges • Purchase incentive of INR 10,000 per kWh for E-2W (maximum ex-factory price to receive this incentive shall be INR 1.5 lakh)
Karnataka 	• Attract investment of INR 310bn (employment potential – 55,000 people). • 100% e-mobility in auto rickshaws, cab aggregators, corporate fleets, and school buses and vans by 2030 • Introduce 1,000 EV buses during policy period	• 100% stamp duty exemption • 100% reimbursement of land conversion fees (on converting agricultural use land into Industrial use) • 100% exemption from duty/ tax on electricity tariff • Interest free loans on net SGST to larger EV and component manufacturing entities • Investment subsidy to MSME (max INR 50 lakhs) to manufacturing enterprises. • Special subsidy up to 50% for setting up Effluent Treatment Plant (ceiling of INR 50 lakhs for MSMEs and INR 200 lakhs for Large Enterprises)
Kerala 	• 1 million EVs on-road by 2022 (including 200,000 2W, 50,000 3W, 1,000 Goods Carriers, 3,000 buses and 100 ferry boats as part of pilot fleet) • Attract investments in EV ecosystem and generate employment • Transition of entire 6000+ buses into E-Buses by 2025	• Capital subsidy of 25% for setting up charging stations and swapping stations (up to a maximum of INR 10 Lakhs for first few stations) • Incentives such as exemption from toll charges and road tax, free parking and free permits for fleet drivers • Concessional Electric tariff, Property tax and Tax breaks (benefit extended from IT & ESDM Policy)
Madhya Pradesh 	• Target of 25% EV penetration for all new public transport vehicle registrations by 2026 • 100% electrification of public bus fleet, government vehicles and commercial & logistics fleets by 2028 • Phase out all fossil fuel based commercial fleets and logistics vehicles by 2030 • Encourage reuse and recycling ecosystems for EV batteries	• Concessional motor vehicle tax @ 1% • Exemption from vehicle registration fees and parking charges • Free permits to shared E-rickshaws, Electric auto-rickshaws, E-Good Carriers (3W) and E-Buses (subject to certain specified limits) • Capital subsidy of 25% (up to maximum amount specified) on the value of charging equipment, to set-up charging station

State	Targets	EV Incentives
Maharashtra 	• Increase number of EV registrations to 5 lakhs • Attract investment of INR 250bn (with employment potential – 100,000 people)	• 25% capital subsidy on equipment and machinery for first 250 commercial public EV charging stations • Eligibility to avail user subsidy over the policy period of five years (with a few requirements and limits) • Exemption from road tax and registration fees for EVs • Concessional electricity tariff (equivalent to residential tariffs) for charging EV
Meghalaya 	• Target of 15% electrification by 2025 (expected to bring about 20,000 EVs) • Encourages reuse and recycling ecosystem for EV batteries	• Purchase incentive of INR 10,000 to INR 4,000 per kWh for E-2W and other EVs on initial EVs purchased and registered (number of EVs for this benefit are specified) • Support for charging stations and charging infrastructure with priority service and benefits to EVs over ICE vehicles • 100% waiver of registration fees and road tax for all types of EVs during the policy period
Punjab 	• Increase share of E-2W (overall), E-Autos (in Target cities) and E-Taxis (in Target cities) to reach 25% of new sales over the policy period • Encourage reuse and recycling ecosystems for EV batteries	• 100% waiver on Motor Vehicle Tax and Permit fees during policy period (ten years when vehicles are manufactured in Punjab) –reduced benefit in case of Hybrid-4W (only 50% waiver on Motor Vehicle Tax and Permit fee) • 25% capital subsidy on equipment and machinery for first 1000 EV charging points (50% in case of local sourcing) • 100% electricity duty exemption for the policy period (five years) for EV Charging points MANUFACTURING UNITS: • 100% reimbursement of net SGST for a period of 15 years to manufacturing enterprises • 100% exemption from electricity duty and change in land use charges

State	Targets	EV Incentives
Tamil Nadu 	• Attract investment of INR 500 bn (with employment potential – 150,000 people) • Replace around 5% of buses as EV and introduce 1000 E-Buses every year • Encourage reuse and recycling ecosystems for EV batteries	• 100% exemption from road tax and permit fees till 30.12.2022 • Waiver of registration charges/fees • 100% reimbursement of SGST paid on sale of EV manufactured, sold & registered in the state till 31.12.2030 • Capital subsidy of 15% on eligible investments in intermediate products used in manufacturing • 100% exemption on electricity tax for manufacturing industries • 100% stamp duty exemption on land • Land subsidy of 50% where investment is made in southern districts (15% for other regions) • Increased capital subsidy (20%) and land subsidy (20% or 50%) for EV Battery manufacturers
Telangana 	• Attract investment of USD 4 Bn (with employment potential – 120,000 people) by 2030 • Promote recycling and cascading of batteries • Charging station for every 50 km on national and state highways.	• 100% exemption from road tax and registration fees for EV purchased and registered in Telangana (for initial EVs sold) • Retro-fitment incentive capped at INR 15,000 per vehicle (for first 5,000 3-seater autos) • Capita subsidy capped at 20% to manufacturing enterprises (subject to cap specified) • 100% net SGST reimbursement, power tariff discount, electricity duty exemption, interest subvention and transportation subsidy (subject to upper cap specified) • 100% stamp duty fee reimbursement on first transaction (50% for second transaction)
Uttarakhand 	• Achieve maximum electrification by 2025 • Charging station for every 50 km on national and state highways • Encourage use of hybrid EVs and create employment opportunities on the supply and demand sides	• Interest subsidy for manufacturing enterprises • Stamp duty exemption, electricity duty exemption, Infrastructure subsidy and SGST reimbursement • 100% exemption on permit fees and motor vehicle tax for five years

State	Targets	EV Incentives
Uttar Pradesh 	• Attract investment of INR 400bn (with employment potential – 50,000 people) • Roll-out 10 lakhs EVs by 2024 • Launch 1,000 E-Buses by 2030 • Achieve 70% public transport electrification in 10 cities by 2030 • 50% electrification in Goods transportation by 2030 (by 2024 in 10 cities) • 2 Lakh charging and swapping stations by 2024 (Slow & Fast)	• Land subsidy through reimbursement up to 25% of the cost of land for certain projects • Capital subsidy at 25% on fixed capital investment for charging stations • Capital interest subsidy, infrastructure interest subsidy, industrial quality subsidy, stamp duty and electricity duty exemption, SGST reimbursements etc. to manufacturing units • 50% reimbursement of interest on loan taken to set-up waste treatment plant (up to specified limit) • 100% exemption from registration fees and 75% exemption from road tax (100% for E-2W)

Policy incentives stated above are indicative and are not exhaustive. The same are subject to various conditions and requirements as prescribed by respective State Governments and Authorities, which may not be readily accessible in the public domain.

Investments in the EV Sector

Investments in the EV ecosystem not only helped OEM manufacturers to manage upfront capital requirements to set-up manufacturing facilities, but also helped in developing shared services such as charging infrastructure and rolling out technological innovations.

The overall fundraising scenario indicated excitement and encouragement among investors towards the entire EV ecosystem, and value-added services, such as charging solutions, telematics solutions and much more. As compared to 2020, e-mobility was negatively impacted due to Covid-19 but has since moved on to be one of the most positively influenced sectors in the latter half of 2021.

Start-ups that attracted major investments in the EV space include

OLA ELECTRIC | BLU SMART MOBILITY | SIMPLE energy | REVOLT
DETEL | TVS | TATA MOTORS | ZOHO
ULTRAVIOLETTE AUTOMOTIVE | AMARA RAJA

A lack of consumer awareness, market visibility, policy clarity and the experience of inefficient, low quality and cheaper products, many E-2W startups in India faced difficulty in attracting investors and penetrating the market. However, fundraising is an uninterrupted process for EV startups and this momentum remained unabated throughout 2021. Despite supply chain irregularities, market volatilities, lockdown like restrictions and an increasing fear of the new Omicron variant in the later half, the investment in EV space has seen a spike.

Additionally, with electrification and technological advancements, a majority of the budding start-ups in the automotive industry are working towards development and manufacturing of products/ components related to EVs. This trend has attracted many large Private Equity and Venture Capitalist players to invest significant amounts in technology-based start-ups, and start-ups that have an existing presence in the market. Prominent 2W and 4W players like Tata Motors, Hyundai, Mahindra & Mahindra, TVS, Hero Electric and many other giants entered this segment and gave a push towards adoption of e-mobility which was compounded further by the Government's EV mission.

At present, 100 percent foreign direct investment is allowed in this sector through the automatic route.

The EV30@30 Initiative to reach 30% sales share of EVs in the automotive market by 2030 may bring a cumulative investment of INR 19.7 lakh crore ($US266 billion) between 2020 and 2030[4].

The Govt. of India has continuously increased public budgetary allocations and investments in the EV space to achieve this target. Initiatives by private sector enterprises also accelerate capital deployment to meet this potential.

Responding to this opportunity, many industry and global players, and investors such as OLA, Mahindra Electric, Hero Electric, Hyundai, Motherson Sumi, Tata and Ather Energy are rapidly expanding their market presence. Moreover, America's biggest EV-giant, Tesla, has recently entered the country by setting-up its R&D center to commence its Indian operations (*some key investment deals in the EV space are covered in the Annexure attached herewith*).

To conclude, India's EV sector is expected to surge multi-fold and is on an upward trajectory due to increasing consumer awareness, rapid change in technological development, coupled with increased interest from the investors' community. While the COVID-19 pandemic has decelerated industry progress, with a decrease in sale of EVs in FY 2021, market sentiment and investment trends in this sector are still positive.

All in all, the realisation of India's EV ambition rests entirely on the thrust of investments provided to manufacturers (vehicles, equipment and battery packs), energy providers and to new-age tech startups.

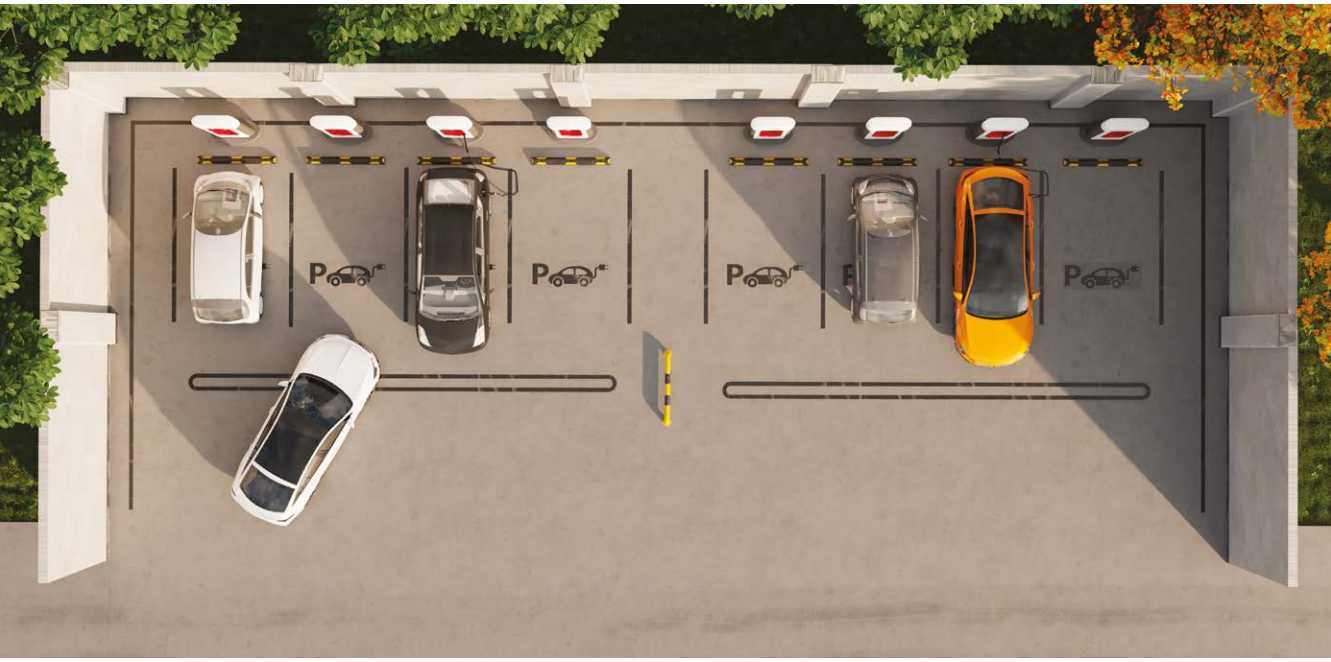
The Future of EV Policies

Increased allocation of incentives and state support represents a bright future for EVs in India. This would not only help establish India's intention to become a manufacturing hub for EVs but would also create ample opportunities for start-ups and private players in EV charging, including advance technologies such as Telematics. The scope of improvement still exists, to develop an environment conducive to the adoption of EVs in India. To date, less than 100,000 vehicles are sold under FAME-II. Further, E-buses haves not witnessed any significant attention despite allocating more than 40% of the total incentives to E-buses.

The current slowdown due to the latest COVID outbreak has invoked the policy makers to wear their thinking hats and come up with deliberate and innovative measures to tackle industry-wide problems such as criteria for qualification, causing unaffordability of manufacturing, the restriction of FAME-II benefits to commercial E-4Ws and requirements of indigenous components. As more EVs enter Indian roads, it is vital to establish well-defined regulations on sustainable disposal of batteries and recycling measures.

Annexure – Recent Investments in EV sector[5]

DEAL DATE	COMPANY NAME	KEY INVESTORS	KEY INVESTORS	INVESTOR TYPE	DEAL VALUE (USD MN)
Dec 21	Oben Electric Vehicles Private Limited	We Founder Circle | Rakesh Somani | Gaurav Juneja | Siddharth Shah | Sumeet Pathak | Milan Modi | Aloknath	Funding	Venture Capital	1.5
Dec 21	Exponent Energy Private Limited	YourNest | 3One4 Capital | Advantedge Incubators | Motherson Group	Pre-Series A	Seed / Accelerator | Venture Capital	5.0
Dec 21	Ola Electric Mobility Private Limited	Temasek | Edelweiss Private Equity | IIFL Asset Management | Ritesh Sidhwani | Zoya Akhtar | Rahul Ravindra Raj Mehta | Vijay Shekhar Sharma | Farhan Akhtar	Series C	Angel / Individual | Private Equity	53.1
Nov 21	Matter Motor Works Private Limited	Mohal Rajivbhai Lalbhai | Arvind Sahay	Series A	Angel / Individual | Promoter / Promoter Co	5.2
Nov-21	Euler Motors Private Limited	ADB Ventures | Inventus Capital India | Blume Ventures | Qimat Rai Gupta Family Office (Havells Group)	Series B	Family Office | Venture Capital	9.9
Nov-21	3Ev Industries Private Limited	Undisclosed Investors	Funding	Seed / Accelerator	2.0



DEAL DATE	COMPANY NAME	KEY INVESTORS	KEY INVESTORS	INVESTOR TYPE	DEAL VALUE (USD MN)
Nov-21	Wattapp Technologies Private Limited	Mukul Rustagi | Relentless VC | Tonmoy Shingal | Supermorpheus | Soumitra Mishra | Saurabh Aggarwal | Ramakant Sharma | Pallav Singh | Nikheel Kamble | Murthy Aradhi | Blume Ventures | Vara Kumar | Khadim Batti | Jasminder Singh | Bhuvan Gupta | Ashish Goel | Arjun Ravi Sheth | Anupam Mittal | Anshuman Bapna | Micelio Fund	Funding	Angel / Individual | Venture Capital	3.0
Nov-21	Axiom Energy Conversion Limited	Kiran Patel	Funding	Angel / Individual	-
Oct-21	Simpleenergy Private Limited	Manish Bharti	Funding (Debenture)	Angel / Individual	0.1
Oct-21	Simpleenergy Private Limited	Manish Bharti | Vasavi Green Tech Private Limited	Funding (Debenture)	Angel / Individual | Strategic Investor	3.0
Oct-21	Axiom Energy Conversion Limited	Mahesh Kumar Purohit | Mohanlal Jesaji Purohith	Funding	Angel / Individual | Promoter / Promoter Co	0.3
Oct-21	Tata Motors Evco	The Rise Fund | ADQ	Funding	Private Equity	1,002.7

DEAL DATE	COMPANY NAME	KEY INVESTORS	KEY INVESTORS	INVESTOR TYPE	DEAL VALUE (USD MN)
Oct-21	Kwh Motors Private Limited	LetsVenture | Vijay Shekhar Sharma | Better Inc | Cloud Capital | Hitesh Oberoi | Gaurav Munjal | Dipak Gupta | Renu Satti | Rajiv Nazareth | Paresh Sukthankar | Matt Van Horn | Haresh Chawla | Ravish Naresh | Rohit Chanana | T Gautham Pai | Kirill Kozhevnikov	Funding	Angel / Individual | Venture Capital	2.0
Oct-21	Ola Electric Mobility Private Limited	Falcon Edge Capital | Softbank	Funding	Private Equity | Venture Capital	129.0
Sep-21	Simpleenergy Private Limited	Atiyas Mobility Private Limited | Atiyas Craft Private Limited | Satheesh Kathula | Quepreon Biologicals Private Limited | Ecoride Automoboiles Private Limited	Funding (Debenture)	Angel / Individual | Strategic Investor	1.2
Sep-21	Seygnux Solutions Private Limited	Venture Catalysts | Micelio Fund | Climate Angels | Turbostart | Advantedge Incubators	Pre-Series A	Seed / Accelerator | Venture Capital	-
Sep-21	Simpleenergy Private Limited	IDIGI Investment Management DMCC | Manish Bharti | Bangalore Umakantha Gayathridevi	Funding (Debenture)	Angel / Individual | Institution	3.0
Aug-21	Simpleenergy Private Limited	Gunjan Samtani | Atiyas Craft Private Limited | Karthik Babu Addapa Laxmi & Kalyan Babu Addapa Laxmi	Funding (Debenture)	Angel / Individual | Strategic Investor	0.4
Aug-21	Impactware Technology Solutions Private Limited	Rishi Bagla | Olivier Guillaumond	Funding	Angel / Individual	2.0
Aug-21	Simpleenergy Private Limited	Karthik Babu Addapa Laxmi & Kalyan Babu Addapa Laxmi | Ravi Renganathan	Funding (Debenture)	Angel / Individual	0.2
Jul-21	Centaur Automotive Private Limited	MaGEHold	Pre-Series A	Venture Capital	-
Jul-21	Evage Ventures Private Limited	Maniv Mobility	Funding	Venture Capital	4.0
Jul-21	Evage Ventures Private Limited	Varun Pahwa | S Chand Properties Private Limited | Saira Viaan Trading LLP | Onnivation | Vasundhara Thakur	Funding	Angel / Individual | Venture Capital | Strategic Investor	0.7
Jul-21	Evage Ventures Private Limited	Vasundhara Thakur | Prashant Singh	Funding	Angel / Individual	0.0
Jul-21	Hero Electric Vehicles Private Limited	Gulf Islamic Investments | OAKS Asset Management	Series B	Private Equity	29.3

DEAL DATE	COMPANY NAME	KEY INVESTORS	KEY INVESTORS	INVESTOR TYPE	DEAL VALUE (USD MN)
Jul-21	Kwh Motors Private Limited	LetsVenture | Angel List | F Byks Network | Navs Future Services LLP | Paresh D Sukthankar and Sangeeta P. Sukthankar | Dipak Gupta and Anita Gupta | MEMG Family Office | Sprouts Investment III | Rajiv Nazareth | Renu Satti | Haresh Chawla | Sanjeebit Choudhury | Amit Ranjan | Yash Desai | Sarcha Advisors | Rishab Karwa | LogX Ventures | Miten Sampat | Harshita Singh | Hitesh Oberoi | Gaurav Munjal | Vss Investco Private Limited | Sumit Jasoria | Ravish Naresh | Pratyush Choudhary	Pre-Series A	Family Office | Angel / Individual | Seed / Accelerator | Venture Capital | Strategic Investor | Institution	1.7
Jun-21	Raptee Energy Inc	Undisclosed Investors	Funding	Angel / Individual	0.7
Jun-21	Kazam Ev Tech Private Limited	Inflection Point Ventures	Funding	Venture Capital	0.9
Jun-21	Cellprop Private Limited	Endiya Partners | GrowX Ventures | Huddle | Micelio Fund	Funding	Seed / Accelerator | Venture Capital	1.9
Jun-21	Blaer Motors Private Limited	The Chennai Angels	Funding	Venture Capital	0.3
May-21	Cellestial E-Mobility Private Limited	Ashik Karim | Gurj Aujla	Pre-Series A	Angel / Individual	0.5
May-21	Blaer Motors Private Limited	Kavya Anna Abraham | Kalpataru Ventures | Krihnaswami Jagannathan | Kalpathi Investments | H & S Supply Chain Services Private Limited | Jayanthan S P | Premkumar Seshadri | Savithur Enterprises Private Limited | M Trust | SPL Trust | Mohamed Sathak | Sundar Seth | Suresh Bharathan | Anjana Software Solutions Private Limited | Vaidyanathan Balasubramanian | V R Venkataraman & Suchitra Venkataraman | Ravichandran Sargunaraj | Sameer Mehta	Funding	Angel / Individual | Private Equity | Venture Capital | Strategic Investor | Institution	0.2
May-21	Magenta Ev Solutions Private Limited	Kiran C Patel	Series A	Angel / Individual	14.6
May-21	Elec Torq Technologies Private Limited	9Unicorns | Sumant Sinha | Samir Khurana	Pre-Series A	Seed / Accelerator	-

DEAL DATE	COMPANY NAME	KEY INVESTORS	KEY INVESTORS	INVESTOR TYPE	DEAL VALUE (USD MN)
May-21	Exponent Energy Private Limited	YourNest | 3One4 Capital | Advantedge Incubators | Sachin Bhatia and Sharmila Bhatia | Sequoia Capital India | Energy Transition VC Private Limited | Sheetal Sandeep | Akshay Singhal | Amit Bhalla | Rajesh Kumar Naidu Yabaji | Chanakya Hridaya | Ranjit Yadav | Ridhish Talwar | Pushkar Singh | Ashwin Sinha | Rohit Sood	Pre-Series A	Angel / Individual | Seed / Accelerator | Venture Capital | Strategic Investor	1.0
May-21	Magenta Ev Solutions Private Limited	Kpi Magenta Holdings Llc & Kiran Patel	Round 4	Angel / Individual	1.0
Apr-21	Revolt Intellicorp Private Limited	Rattanindia Enterprises Limited | Rahul Sharma | Purshottam Lal Sharma | APL Buildwell Private Limited | Manju Devi Mohanka | Narendra Firodia | Ansuya Sharma | Indu Sharma	Funding	Angel / Individual | Strategic Investor | Promoter / Promoter Co	17.7
Apr-21	Starya Mobility Private Limited	ah! Ventures	Funding	Venture Capital	0.3
Mar-21	Greencell Mobility Private Limited	EverSource Capital	Acquisition	Private Equity	26.9

DEAL DATE	COMPANY NAME	KEY INVESTORS	KEY INVESTORS	INVESTOR TYPE	DEAL VALUE (USD MN)
Mar-21	E-Chargeup Solutions Private Limited	Anand Goel | C.E. Info Systems Limited	Seed	Angel / Individual | Strategic Investor	0.1
Mar-21	Euler Motors Private Limited	ADB Ventures | Jetty Ventures | Inventus Capital India | Blume Ventures | Srinivas Anumolo | Antony T F Lundy | Perry Trebatch | Arvind Sanger | Ganesh Krishnan | Sujeet Kumar	Series A1	Family Office | Angel / Individual | Venture Capital	5.9
Jan-21	Greencell Mobility Private Limited	EverSource Capital	Acquisition	Private Equity	9.5
Jan-21	Centaur Automotive Private Limited	Megehold Pte Limited | Sai Bhuvan Teja | Siva Chandra Mouli | Prudhvi Sagar Sreeramoju | Anantha Sanjana | Sudeep Sudarshan Badangod | Sujit Emmanuel | Aditya Prasad Narisetty | Sunil Kumar Sehrawat | Mohana Sai Cherukuri | Velaga Sri Lakshmi Manoharam | Yellapu Uma Shanthi Madhavi | Puramsetti Venket Vinay Kumar | Vineeth Reddy Chitteti	Round 1	Angel / Individual | Strategic Investor	0.1
Jan-21	Simpleenergy Private Limited	Nithya NR | Manish Bharti | Jayakumar Pitchaipillai	Funding (Debenture)	Angel / Individual	0.2

Please refer to the next article in this series,
"Electric Vehicle Charging Infrastructure – Enabling an EV Friendly Economy"
for an overview of EV Charging landscape.

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ENDNOTES

1 The 2020 World Air Quality Report , IQ AIR , https://www.iqair.com/world-air-quality-report (Accessed January 18, 2022)

2 Victoria Klesty, Electric Cars are to hit 65% of Norway Sales as Tesla Grabs overall pole, https://www.reuters.com/business/autos-transportation/electric-cars-take-two-thirds-norway-car-market-led-by-tesla-2022-01-03/, (Accessed on February 11, 2022).
3 Press Information Bureau, https://pib.gov.in/PressReleseDetailm.aspx?PRID=1587249#:~:text=In%20order%20to%20address%20 the,Km%20in%20the%20cities%20and (Accessed January 18, 2022).
4 Mobilising Finance for EVs in India: A Toolkit of Solutions to Mitigate Risks and Address Market Barriers, NITI Aayog and Rocky Mountain Institute, January 2021, https://e-amrit.niti.gov.in/assets/admin/dist/img/new-fronend-img/report-pdf/mobilising_finance_for_evs_in_india_compressed-1-10.pdf (Accessed on February 15, 2022)
5 Based on deals available in automobile sector with electric vehicles sub-sector for calendar year 2021, https://private-circle.co/company/mca_new/mca-listing (Basis data updated as on December 2021)


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FEATURE

Electric Vehicle Charging Infrastructure: Enabling an EV Friendly Economy

L. Badri Narayanan, Sarang Dublish and Aman Singhal

Energy for Electric Mobility

Building robust charging infrastructure is indispensable to the success of the Indian EV story. A limited presence of charging stations across the country is a key obstacle to EV adoption in India. EV charging systems work similar to fossil fuel dispensing stations, by supplying energy to battery packs and thus, are essential to sustainable operation of EVs.

EVs typically carry limited on-board energy through small sized battery packs. The size of a battery pack depends on the storage capacity available in the vehicle and its operational range. Due to their smaller sizes, these batteries need to be charged frequently.

Charging requirements of EVs varies as per the type of EVs such as E-2W, E-3W, E-4W or E-Buses; and their intended use, that is, whether for private or commercial purposes.

Although the adoption of EVs in India is low due to multiple factors, the uptake of EVs in India essentially depends upon comprehensive, easy and convenient availability of charging systems and public charging stations.

What are EV charging stations? – EV charging stations comprise of machinery that supplies electric energy from the grid to vehicle batteries. At charging stations, electric vehicles such as two-wheelers, cars and buses can plug-in to recharge their batteries. There are different types of chargers to supply different currents and voltage levels to meet vehicle-specific battery requirements.

Charging stations are also called "EV Supply Equipment (**EVSE**)" and provide special connectors that conform to a variety of electric charging connector standards.

Some electric vehicles are equipped with on-board charging converter systems that convert power supplied from the wall socket of the EVSE to the battery, whereas other chargers provide direct current to the vehicle battery and bypass the

ARTICLE IN FOCUS

The successful assimilation of electric mobility depends on the adoption of electric vehicles and widespread availability of energy charging infrastructure.

Currently, there is an imbalance in the growth of the EV industry in India with the provision of charging infrastructure severely lagging market demands.

The Government of India has announced the FAME-II policy to increase electric mobility infrastructure in India.

There is tremendous scope for private players, in the hardware, software and operational service industry to provide a wide range of services to consumers.

on-board converting system, thereby providing higher charging rates.

Global Leaders in EVSEs

At present, Norway is the frontrunner in electric mobility, globally, with three out of every four vehicles sold being electric.

This dream towards whole-hearted adoption of EVs is achieved through strong local incentivisation, making EVs more economical than Internal Combustion Engine (**"ICE"**) vehicles, and through a well-established charging infrastructure network[1]. As of October 2020, Norway has more than 16,000 charging stations.

Other countries such as USA and China are in advanced stages of transitioning to electric mobility and have developed various strategies to build charging infrastructure. In USA, significant EV market penetration and charging outlets are found in California. The state has about 32,000 EV charging stations out of 100,000 EV charging stations present in the country. China, on the other hand, has around 200,000 EV charging stations[2].

Compared to other leading markets, charging infrastructure development in India is at a nascent stage. The Government of India has introduced various plans and policies for adoption of EVs. However, no impetus was provided to encourage setting up of charging stations in India. With the efflux of time, the Second Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (**"FAME-II"**) policy was introduced, with the specific allocation of INR 1,000 crores to boost the availability of charging infrastructure.

As on 11th February 2022, Govt. of India has sanctioned a total of 4,937 charging stations in India[3].

Unlike global leaders in EV mobility such as USA, China and the United Kingdom, high operational costs, uncertainty of utilisation and slow growth for DISCOM suppliers to provide increased loads are some of the few hindrances that are holding back India from setting up EVSEs and charging infrastructures.

Key factors towards adoption of an EV charging ecosystem

Among other factors for adoption of EVs (such as performance comparison, upfront cost variation in comparison to ICE vehicles, lack of financing and reasonable charging infrastructure), the following factors also play a crucial role in the development and growth of the EV charging space.

- Central Government and State Government Initiatives (by introduction of FAME-II policy and separate state policies)
- Electric Vehicles Manufacturers (inculcating innovation and a demand of EV charging stations)
- Battery Manufacturers (providing cheaper, reliable and effective battery packs)
- Charging Infrastructure Providers (managing power load and providing maintenance services)
- Charging Space Providers (such as parking lots, malls, gyms, cinema halls, office complexes, restaurants, etc.)

Recent Developments in Charging Infrastructure

How active are start-ups in this industry?

SoftBank

Softbank backed Ola Electric plans to set-up the world's largest electric two-wheeler charging network for its customers in India, with more than 100,000 charging points across 400 cities.

ATHER

Ather Energy intends to set-up and install at least 30 fast-charging public network stations called the "Ather Grid" in Mumbai. The company has already installed more than 100 chargers in India. The company is also planning to expand its foray to top cities of India in the near future.

charzer

Charzer, a Bengaluru based start-up is creating a vast EV charging station network by converting neighbourhood kirana stores, cafes, restaurants, malls and tea shops into EV charging stations.

Panasonic

Panasonic Life Solutions partners with PMI Electro (India's leading Electric-Bus manufacturer) to provide fast-charging infrastructure solutions across 17 cities for operating more than 1,000 Electric buses. These buses will operate for 200-220 km daily and will be able charge within 40 minutes.

BattRE #DontBeFuelish

BattRE, an EV start-up has launched low cost RE:charge stations. The company aims to install these chargers at homes, offices, or individual shops. RE:charge Stations can also provide an additional source of income for shop owners who can offer charging services to EV owners in the area.

PARTNERING WITH E-COMMERCE GIANTS

- Amazon has partnered with Mahindra Electric to deploy 10,000 E-3W in the country by 2025. Presently, the company has pressed around 100 EVs into service in seven cities.
- Flipkart has partnered with Hero Electric, Mahindra Electric and Piaggio to make its logistic fleet completely electric by 2030 having more than 25,000 EVs (E-2W, E-3W and E-4W).

Some prominent companies offering EV charging infrastructure includes SemaConnect, ABB and Tata Power.

Recent Announcements from the States

Department of Heavy Industries and Telangana State Authority will set-up 138 EV charging stations within the state, near metro stations and public places, by end of 2021 to encourage the adoption of eco-friendly vehicles.

EESL SECI SUN FOR EVER

Energy Efficiency Services Limited (EESL) and Solar Energy Corporation of India (SECI) to work closely to develop solar-power charging stations alongside National Highways and State Highways in Andhra Pradesh to promote electric vehicles and reduce carbon emission.

Components of EV Charging infrastructure

EV charging infrastructure includes several components such as power control units, charging guns, cables, connectors, amongst others. Typically, these components are classified into three broad categories:

A. Hardware Infrastructure

An EVSE includes several hardware components and includes the following:

- **Power assembly:** It supplies the power to the EV's on-board battery charger.
- **Controller:** It manages basic charging functions, like turning a charger on and off, managing and metering the power usage.
- **Charging Gun:** It consists of a cable and a connector which is plugged into the vehicle to transfer electricity by making a safe physical connection between the charger and vehicle.

A large number of SMEs and start-ups represent a significant portion of the EV Industry and have come up in various parts of the ecosystem – OEMs, component manufacturers, charging point operators and other service providers.

Some established players such as NTPC, EESL, Delta Electronics, Exicom and Okaya Power have laid down their EV strategies by venturing into EV-charging businesses and making large investment commitments.

B. Software Infrastructure

Software infrastructure includes the use of Central Management System (**"CMS"**) or Mobile Applications. EVSE providers maintain software that are designed to administer and manage charging stations and charging networks.

CMS and software applications allow the user to access following functions:

- Locate available charging stations within specified vicinities
- Reserve an available slot at a charging station
- Two-way flow of data between the charging station and the user along with quick deployment of basic information such as configuration of the vehicle, or the charging station
- Set prices and manage billings

Start-up opportunity: Start-ups can establish cloud-based platforms for EV charging management by providing information about the current as well as future status of chargers, facilities to book a slot remotely in advance (for few days) and provide invoicing.

A situation of widespread EV adoption but with lesser development of charging infrastructure may trigger consumer anxieties caused by long queues of vehicles outside stations, disruption of traffic flow by the build-up of traffic jams and general inconvenience to the surroundings. Considering these challenges, access to charging infrastructure and innovation in technology certainly needs a stronger push.

Also, start-ups could develop software connecting mobile network providers with EV charging operators to interact with customers and minimise demand-supply issues.

C. Maintenance and other Service-related Infrastructure

Usually, EVSEs are installed at convenient and accessible public locations and require regular maintenance and servicing. It is for Discoms or charger operators to plan regular service and maintenance of charging infrastructure.

CHARGING TRENDS OF THE FUTURE

Presently, light mobility vehicle constitutes a majority of EV sales in India, with limited adoption of eco-friendly mobility amongst bigger vehicles such as Buses and Trucks. When vehicles (E-2W or E-4W) are used for intra-city travel with a lower run time, consumers prefer to charge their vehicles using home chargers. However, in case of commercial vehicles such as E-4W, it is anticipated that users will prefer public charging stations.

At the moment, many prospective customers indicate "range anxiety", that is the fear that they may be stranded without a charging station within reach. In addition, customers seem to face a dilemma of charging fit and finding a compatible charging point. Charging points need to be easily assessible and standardised, which means that a single charger must be accessed by all type of EVs (E-2W, E-3W, E-4W and Hybrid EVs), similar to smartphone chargers which are now compatible with multiple versions of smartphones. To combat this challenge, a highly scalable solution is required.

Type of Charging Methodologies

The most commonly used EV charging methodologies globally is categorised into two segments: Alternating current (AC charging) and Direct current (DC charging).

A. AC charging (Slow/ Moderate)

AC charging is the most common form of charging EVs in India, and uses low voltage charging technology. These types of chargers are available with or without managed charging capabilities and are ideally very simple to operate. The charging rate in these chargers starts from 2.5 kW and can go up to a maximum of 20-22 kW.

These chargers are comparatively cheaper and convenient to use. Such chargers are ideal for users looking for comfortable charging solutions in residential zones, and are usually used for charging vehicles overnight, due to their low voltage charging speed.

B. DC charging (Fast)

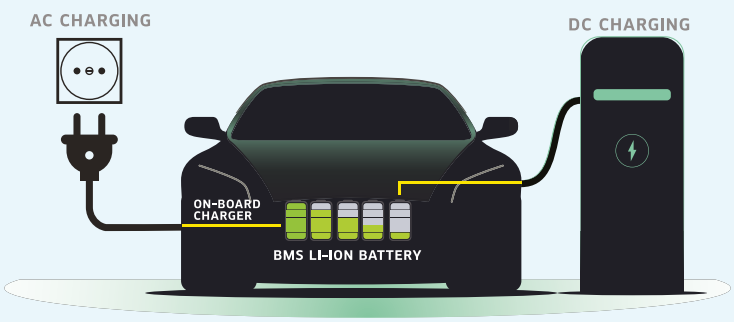
DC charging/ fast charging is commonly used when the vehicle requires a rapid charge. This charger converts power and sends it directly into the car battery, bypassing the on-board convertor.

DC chargers are usually expensive, high quality and have a higher tariff rate. Additionally, these chargers are mostly installed at public charging stations and are ideal for high power utilisation vehicles such as cab fleets for long-distance trips, allowing them to recharger faster.

EVSE OUTPUT – AC OR DC

In an AC charger, the vehicle has an on-board charging convertor system (or an on-board charger) that converts AC into DC and transfers the energy to a Battery Management System (**"BMS"**).

In case of a DC charger, power is directly supplied to the EV at a high-power rating.



AC – DC CHARGING SCENARIO

Battery Swapping – An Alternative to Charging

As we move towards a greener and eco-friendly environment through the adoption of EVs, the focus will inevitably drift towards the setting up of EV infrastructure and subsequently to develop and improve charging efficiencies.

This calls for constant innovation in EV technology and operational models for the widespread adoption of EVs.

An alternative to the conventional charging infrastructure model exists and is being commercially exploited by various start-ups working on the 'Energy-as-a-service' model. **Battery swapping is an alternative re-fuelling option in which a drained battery is exchanged for a fully charged battery pack at a battery swapping station. The swapping station provides an infrastructure where fully charged batteries are kept. Swapping of battery often take only couple of minutes which eliminates a user's wait time providing re-fuelling experience akin to an ICE vehicle.** This alternative not only hastens EV adoption but also eliminates range anxiety.

Features of Battery Swapping:

- Alternative to plug-in charging
- Time efficient
- Better operational efficiency and battery life due to charging in controlled environment
- Reduces upfront cost of EVs

At present, a majority of E-2W and E-3W are equipped with detachable battery packs which makes them feasible for the adoption of a battery swapping refuelling model.

Few start-ups in this segment

- Sun Mobility
- VoltUp Smart Swapping
- Lithion Power
- Esmito
- RACEnergy
- E-ChargeUp

Potential business models for developing EV charging stations

A potential business model of developing charging infrastructure would depend upon various factors such as provisioning of land, acquisition of charging equipment, installation of charging equipment and maintenance & service operations. We have identified few models that may be adopted in the Indian markets.

Potential Business Models	Factors for setting-up EV Charging Stations			How do these models operate?
	Provision for Land	Acquisition of Charging Equipment	Installation & Operation	
PPP (Public-Private Partnership) business model				This is one of the most effective models as it is difficult to obtain contiguous land. Municipalities and local governments will provide land to private players on lease. The revenue from the charging station (through sale or advertisement) is shared between the government and private players. ***This model leverages the expertise of private players in terms of technology and operations.*** The Department of Heavy Industry (Govt. of India) has recently invited proposals for installation and operation of charging stations on major highways and expressways in the country.
Cab Aggregators facilitating public charging				In this model, cab aggregators or fleet operators will set-up charging infrastructure for their own vehicles. Private users can access these charging stations to utilise spare capacities.
OEMs/ Vehicle manufacturer's model				In this model, vehicle/ equipment manufacturers set up their own charging infrastructure at different locations near dealership outlets or city-centres. ***This model develops confidence among end users due to the vast expertise of auto-giants.*** Ola Electric, an E-2W manufacturer in India, is planning to set-up a charging network for its customers in India with more than 100,000 charging points. Presently, many automakers in India have joined hands with various EVSE providers to set-up & operate charging stations. Many companies are also planning to develop charging stations in metro-line parking lots or near dealership showrooms.

GOVERNMENT (CENTRAL & STATE)/ PSUS PRIVATE COMPANIES/ INVESTORS
FLEET OPERATORS/ AGGREGATORS OEMS/ AUTOMOBILE CO.

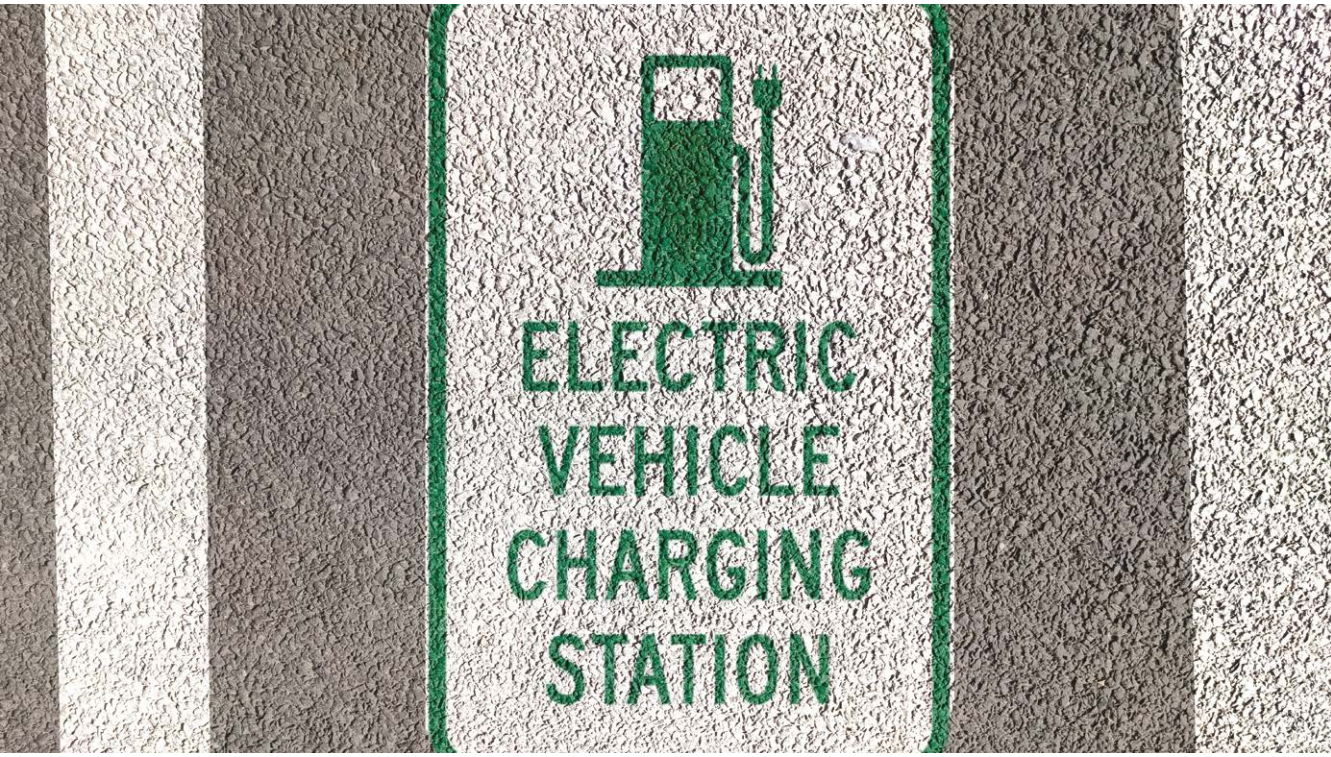
Conclusion

Of more than one million EV public charging points installed around the world[4], the total charging stations in India constitutes about 0.1%.[5]

Electric mobility in India differs from other countries that have higher EV penetration and stable market conditions. This is due to social norms, geographical area, technological development, policy introduction & adoption, as well as the economy.

A large population, lack of adequate public infrastructure and lower affordability are some barriers towards mass adoption of eco-friendly vehicles. Needless to say, that the impact of Covid-19 has deeply affected our economy and may further delay the development and implementation of EV infrastructure in India in the short run. The EV industry might have to fight for survival and reassess its previous market predictions in light of the pandemic.

Electric mobility in India differs from other countries that have higher EV penetration and stable market conditions. This is due to social norms, geographical area, technological development, policy introduction & adoption, as well as the economy. **However, fast-depleting fossil fuels and increasing environmental concerns play a major role in promoting and adopting EVs and their charging infrastructure.**



Changing the Perspective

Indian consumer habits need to move away from the current way of re-fuelling vehicles at a designated fuel point to 'fragmented and robust' EV charging locations.

Successful adoption of EVs is largely dependent on a change in the consumer's perspective. There is a likelihood of greater assimilation and adoption of EVs if consumers can appreciate the ease of utilisation provided by charging points that are available at home and offices, apart from public charging stations. This will demonstrate a greater ease of operation to the consumer than traditional ICE vehicles, where refuelling is only possible at designated "fuel stations", leading to long queues, change of routes to access fuel stations, so on and so forth.

The current EV policy framework of India comprises of a public–private partnership which encourages EV adoption rate and expansion of EV charging infrastructure with increased focus on minimising charging time of EVs, increasing utilisation of available renewable energies for EV charging, and eliminating location/distance constraints by planning hybrid/robust charging networks.[6]

To adopt EVs and expand charging infrastructure in India, more focus is required in setting up public charging stations rather than private charging points to fulfil demands of

higher population density. The Government of India has approved FAME-II for deploying and developing public EV charging infrastructure in the country, with these objectives in mind.

The 'Policy Think Tank of India' - NITI Aayog has targeted 70% of all commercial cars, 30% of private cars, 40% of buses and 80% of two-wheeler and three-wheeler sales in 2030, to be of electric vehicles. To achieve such targets, charging infrastructure needs to ramp up exponentially in this decade.

Please refer to the next article in this series,
"Telematics: The New Frontier in AutoTech"
for an overview of Telematics in this sector.

L. Badri Narayanan is an Executive Partner at the firm. **Sarang Dublish** is a Joint Director at the firm. **Aman Singhal** is a Senior Associate at the firm.

ENDNOTES

1 I. Wagner. Market share of electric cars (BEV and PHEV) in Norway 2009-2020, STATISTA (February 19, 2020), https://www.statista.com/statistics/1029909/market-share-of-electric-cars-in-norway (Accessed January 17, 2022).

2 Mathilde Carlier, Electric Vehicle charging stations and outlet in U.S.-January2022, STATISTA (January 13, 2020), https:// www.statista.com/statistics/416750/number-of-electric-vehicle-charging-stations-outlets-united-states/) (Accessed January 16, 2022).

3 Ministry of Heavy Industries, https://dash.heavyindustry.gov.in/ (Accessed January 16, 2022).

4 Kyle Stock, Global Electric Vehicle Cord Top 1 Million, BLOOMBERG (August 5,2020), https://www.bloomberg.com/news/articles/

2020-08-05/global-ev-charging-points-hit-1-million-threshold (Accessed January 16, 2022).

5 Shalini Sharma, India has so far installed 933 EV charging stations across the country: CEA, PSUWATCH (July 30, 2020), https://psuwatch.com/India-installed-ev-charging-933-ceat#'text=New%20Delhi%3A%20Delhi%3A%20its20latest installed%20by%%20state%2Drun%20PowerGrid, (Accessed January 16, 2022).

6 Ayush Verma, 970 Government Funded Public EV Charging Station Installed in India so Far, SAUR ENERGY, (March 24, 2021), https://www.saurenergy.com/ev-storage/970-public-ev-charging-station-installed-india, (Accessed January 16, 2022).

FEATURE

Telematics: The New Frontier in AutoTech

Neelambera Sandeepan

Understanding Telematics and its Uses

The accessibility of mobile phones, affordability of data, and a consumer need for constant connectivity and content is responsible for the emergence and growth of telematics. Telematics is communication technology for the automobile industry, based on information flowing to, and generated from, vehicles via wireless networks[1]. It consists of two disciplines as the name suggests: (i) telecommunications (communication over long distances) and (ii) informatics (information processing). Telematics works on the convergence of wireless communications, location technology, computers, and in-vehicle electronics. Through telematics systems, data generated inside the vehicle is relayed to back-office systems through wireless networks. Alternatively, data is generated from back-office systems, and is transmitted to the vehicle, either through the cell phone or a unit fitted in the vehicle. This includes push data, i.e., data that is pushed to the user device in the form of weather forecasts, maps, internet data updates, stock updates etc.

Telematics consists of two disciplines: (i) telecommunications (communication over long distances) and (ii) informatics (information processing)

Telematics as a tool has been useful for automobile original equipment manufacturers (**"OEMs"**), passenger as well as commercial vehicle segments, and fleet managers.

While OEMs have largely focused on increasing sales, innovation in telecommunications and data analytics has created this new vertical of telematics. It is no secret that connectivity services were considered a luxury in a not-so-distant past. However, recent surveys show that a majority of consumers are willing to switch brands, and even pay for connected services in a subscription-based model[2].

A growing interest for connectivity services in automobiles amongst transport service providers, logistics operators and even passenger vehicle segment has enabled companies like LocoNav to shape an entirely new segment for the automobile industry - telematics.

In 2015, LocoNav started its operations with the objective of transforming India's automobile landscape. LocoNav aims to deliver a single platform to run and manage one's fleet operations with

ARTICLE IN FOCUS

Telematics, that is, information technology related to vehicular usage, is an off-shoot of the electric vehicle industry and is gaining rapid momentum. In India, telematics provide business opportunities for suppliers of IT services, infotainment, and even OEMs as consumer demand for smart vehicles increases. However, consumer data, especially personal data, and related privacy concerns, must be well-regulated by legislative reforms and a robust policy framework.

ease. From hassle-free commercial vehicle loans, procuring commercial fleet supplies, connecting customers with skilled and verified drivers, to a telematics driven tracking ecosystem, LocoNav works as a one-stop solution to cater to all fleet needs of their customers. In about five years, through its platform for integrated vehicle management services, it has made smart fleet management accessible to thousands of businesses across industries in over a hundred cities in India, and beyond.

Telematics has facilitated collaboration between OEMs and third-party service providers that work on generating data, including online weather forecast services, maps, information on traffic conditions, news, stock updates, social messages and entertainment to the vehicle, etc.

The development of telematics has led to the mushrooming of companies, which cater solely to this market. As such, telematics has facilitated collaboration between OEMs and third-party service providers that work on generating data, including online weather forecast services, maps, information on traffic conditions, news, stock updates, social messages and entertainment to the vehicle, etc. Separately, it allows OEMs to improve their after-sales service by collecting data generated inside the automobile. For instance, an OEM can track geolocations and usage patterns of a vehicle for maintenance needs and performance information. Telematics are also incredibly useful for fleet management services where fleet managers can utilize telematics to keep a track on the vehicles in their fleet, monitor fuel efficiency, driver behaviour, safety norms, etc. Telematics solutions also provide extremely helpful value-additions for consumers through offerings like usage-based insurance.

Following is an illustration of a telematics value chain. As indicated below, a telematics unit serves as the communication component that receives and provides data to the vehicle, which is sourced from either the systems built into the vehicle, or third-party media. Third-party information is predominantly Internet driven data, voice and video content, provided by web portals. Here, consumers are either drivers of the vehicle, or passengers, or even fleet owners accessing and utilizing vehicle generated data.

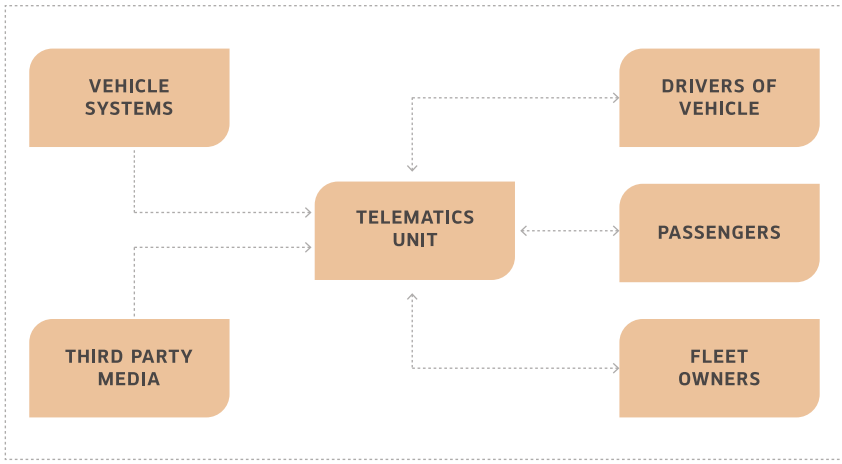


Fig. 1: Data flow in vehicular telematics

Global Market for Telematics

A recent research on car data monetization trends and characteristics by Mckinsey suggests that the value pool of telematics could be as large as US$750 billion by 2030[3]. The recent increase in demand for telematics and its growing significance can be largely attributed to two reasons - firstly, an increasing number of governments globally are mandating OEMs to install certain telematics services in vehicles, and secondly, in an increasingly connected world, consumers have begun to seek greater connectivity and intelligence in their vehicles.

Burgeoning consumer demand has further incentivized OEMs to invest more in providing telematics services inside their vehicles. Since March 2018, the European Union (**"EU"**) has mandated OEMs to install the e-Call system, which is an automotive emergency call system that generates an automated call in the event of a crash, deployment of airbags, or a breakdown. Similar telematics services have been mandated by Russia for new cars since the end of 2017. Countries like Mexico have regularized the use of radio-frequency-identification (**"RFID"**) tags to bolster vehicle-antitheft system. While an increasing number of countries are mandating telematics in vehicles, adoption rate of voluntary-use telematics currently hovers around 20% in across the world[4]. This adoption rate is bound to grow with an increase in consumer demand. A comparison of two surveys carried out by Mckinsey in 2014 and 2015 depicts that the number of consumers who were willing to change their automobile manufacturers for better connectivity services nearly doubled, rising from 20% to 37%. Further, consumers were more willing to use a subscription-based payment model for telematics services in their cars, with approval ratings also increased from 21% to 32% globally in 2015. Therefore, consumers see value in such services and are willing to pay for them[5].

Countries like Mexico have regularized the use of radio-frequency-identification ("RFID") tags to bolster vehicle-antitheft system.

In the last few years, India has also witnessed an increased deployment of telematics solutions, particularly in the commercial vehicle segment. According to a report by global market researcher 6Wresearch, the commercial vehicles telematics market in India is projected to reach 1.4 million telematics installations by 2022[6]. The demand for increased adoption of telematics solutions by commercial vehicles in India stems from a surge in road accidents, security concerns and an exponential increase in the need for fleet management. Additional benefits from employing telematics solutions, such as reducing fuel consumption and repair costs, are also expected to further spur the growth of this market.

Indian consumers are developing a steady interest in telematics services. A 2021 survey conducted by Tech Mahindra indicated that

90% of the participants preferred buying a vehicle with telematics systems, while 45% of them deemed it necessary to use telematics as a safety measure in vehicles, and 65% of the participants were comfortable with sharing their location details with fleet managers[7].

... the telematics market for Indian connected trucks will grow at 25% year-over-year rate from 2020

The rate of market penetration for telematics in the commercial vehicles (CV) market in India was estimated to be 4%, with total installed products being 292,560 units as of 2019, and it is expected that the telematics market for Indian connected trucks will grow at 25% year-over-year rate from 2020[8].

Potential Features and Benefits of Telematics

Some benefits of installing a telematics system in vehicles include:

- Constant connectivity through a wireless network, that enhances safety and vehicle reliability for the vehicle owner;
- Protective features such as automatic crash response, and emergency and crisis assistance;
- Security aspects such as remote door lock / unlock, and stolen vehicle tracking;
- Navigation assistance through maps and turn-by-turn assistance;
- Vehicle diagnostics, which will ensure the health and performance of the vehicle from the data collected by the telematics system. This enables OEMs and owners to carry out repairs, or replacement of parts, before the occurrence of wear and tear scenarios;
- News and other infotainment updates like weather forecasts, stock updates, etc.[9]

The Mckinsey Report claims that the overall advantages of car telematics are based on "network-effects", i.e., higher the adoption rate of telematics, higher will be the benefits from this technology in the country. For instance, in a country with 20% adoption of telematics, a reduction in the rate of road accidents and fatalities would be seen which would steadily evolve into traffic optimization and other smart city infrastructure benefits as the adoption rates increase[10].

While telematics is an essential feature of electric vehicles (EV) and has evident benefits for business fleets, telematics can also assist fleet managers in their transition from internal combustion engine (ICE) vehicles to EVs. Telematics enables fleet operators to decide to what extent it is feasible and reasonable to switch from ICE vehicles to EVs. This involves analysing data gathered via telematics component used in an ICE vehicle in relation to vehicle use and driving behaviour as if the vehicle operator were driving an EV. Considering the average or maximum distance required to be covered in a day, availability of charging infrastructure, driving habits and techniques, etc., a fleet operator can decide whether and how to switch from ICE to EV.

It is evident that the benefits of telematics are manifold. However, concerns of cyber-security, data and privacy protection cannot be disregarded. Instances show that attackers can gain access to critical features of a vehicle, increasing the risk of accidents and data theft. In 2015, white hat hackers infiltrated Jeep Cherokee's telematics service "Uconnect", remotely sending commands to the dashboard functions, transmission, brakes and steering, and this resulted in the manufacturer recalling 1.4 million vehicles to fix the security flaw[11].

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Potential Business Models for Telematics Service Providers

There are the three common business models utilized by telematics providers:

The B2C model relies heavily on navigation, vehicle GPS tracking, entertainment, location-based services, information, etc. The focus here is largely on the end user experience.

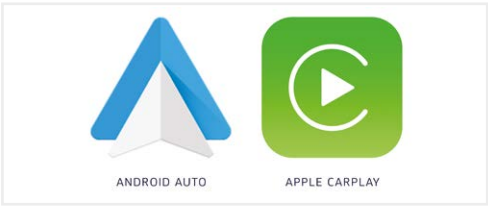
The B2B model concentrates on monetizing data gathered by OEMs for third-party businesses to provide customized solutions. Such scenarios include the following:

- Data used by insurance companies to determine usage based insurance such as Pay-As-You-Drive schemes, and customized insurance plans created based on pattern recognition;
- Using vehicles as content consumption and distribution platforms for Content Providers;
- Improved fleet management for Logistics Providers;
- Better enforcement of environment compliance policies of the government;
- Enhanced network and infrastructure development by telecommunications equipment manufacturers for telematics services; and
- In the context of electric vehicles, utility companies can track charging schedules for vehicles to optimize power supply through the day, etc.

Similarly, the B2P model is used by OEMs to provide a better product in the form of an after sales monitoring tool to its customers wherein actionable intelligence is provided using diagnostic data in relation to potential automotive failure and its root cause. Determination of the potential wear and tear in the vehicle in advance enables better operation of the vehicle through predictive or preventive maintenance. This model

allows for cost cutting through warranty predictions and helps OEMs identify novel post sale services to its customers.

Integrated business models of third-party technology providers and telematics services are on the rise.



Integrated business models of third-party technology providers and telematics services are on the rise. Uber is an example of superior software algorithms that allow for short waiting times for consumers by directing drivers to locations where consumers are most likely to hail a cab, and matching demand to supply through its price surge mechanism[12]. Another example is Google's 'Android Auto' that mirror's the interface of the consumer's android phone to their car's dashboard hardware[13]. In exchange, the app collects data from the vehicle's GPS system, such as location information and other opt-in user information that would improve customer experience. Apple CarPlay is another infotainment app that works on the same model[14].

Smart Trucking

Telematics is also utilized by most of the large truck manufacturers for what has come to be known as 'smart trucking'[15]. Smart trucking is a telematics solution that relies on data, such as driver behaviour, fuel availability, road quality, navigation, amongst others, to improve productivity and meet timelines for delivery. Data generated by trucks also helps improve asset utilization, as well as tracking consignments and deliveries, asset health monitoring, fuel-efficiency reporting, and fuel-level monitoring. Uptime centres that provide 24*7 service support and remote diagnostics to operators utilize such data. Most large truck manufactures, including Tata Motors, Eicher, Volvo, Ashok Leyland, and DECV [16] produce telematics-compatible trucks so that drivers and fleet owners can access a variety of services. However, some facilities like fleet management services and vehicle health data have restricted access though subscription-based models.

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Telematics and the Insurance Sector

Telematics systems are also being adopted by the insurance sector. Insurance telematics involves the use of telematics by motor insurers to customize insurance plans and premiums to reflect the actual risk for a customer. Some of the main telematics services offered by insurance service providers are illustrated below. This includes 'Pay as you drive' and 'Pay how you drive'. It takes into account several features such as speed, road

used, time of driving, braking, and cornering amongst others.

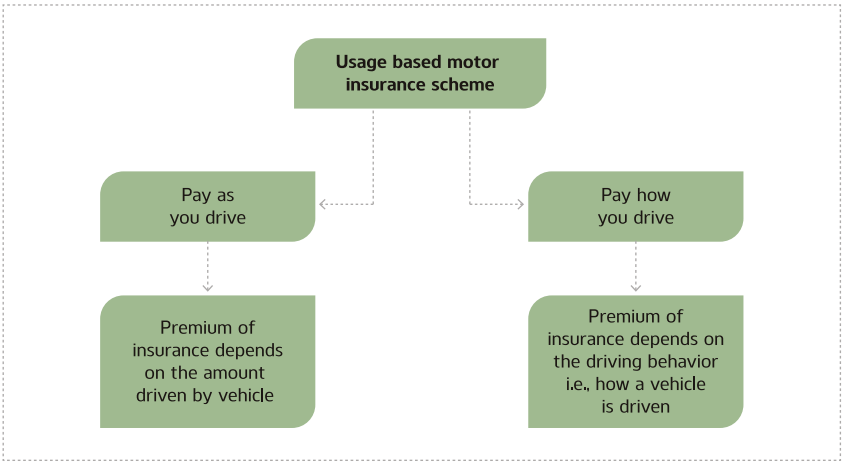

Fig. 2: Telematics in Vehicular Insurance

Utilizing benefits of employing telematics for automotive insurance has certain advantages over traditional third-party insurance. Telematics system allows the insurance provider to use better pricing algorithms and increase customer interaction, which ultimately helps insurance providers in retaining customers. Similarly, data collected from telematics system helps the insurers in assessing the validity of claims and the extent of damages. However, it does pose concerns regarding privacy. Customers may find it disconcerting to have an external company access their data and therefore, it is imperative that insurance companies clearly spell out how such data will be used and guarantee non-disclosure of the collected data to any third party without prior consent of the customer.

Top Trends in India

In India, telematics start-ups have largely focused on fleet management, infotainment and security surveillance services. There's a huge emphasis in India on fleet efficiency and optimization in the automotive market, with both large automakers, and start-ups offering solutions in this area[17].

Fleet management involves GPS tracking, vehicle monitoring, and security surveillance on-the-go.

Fleet management involves GPS tracking, vehicle monitoring, and security surveillance on-the-go. For instance, in 2020, VIVO India collaborated with Onelap Telematics to provide GPS tracking services to its entire fleet[18].

Amongst the many applications of telematics, Infotainment has seen the greatest interest and development in recent times, especially in urban areas. An example of this is Ola-Play, which has been introduced by the cab-aggregator Ola Cabs, as an in-cab entertainment service

model where passengers can listen to music, watch short web-series and movies during their trips. With majority of companies outsourcing infotainment systems included in cars to big tech such as Apple, Google and Amazon, and these companies, in turn, monitoring users through infotainment systems, it can be safely said that cars with telematics system are the next data-guzzling platform.[19]

Similarly, security surveillance has become common, and many school buses have CCTV recordings, with similar solutions being considered for public transport in multiple cities as well.

India has ramped up its efforts to install telematics services in public transport, with telematics systems being installed in public vehicles in accordance with Automotive Industry Standard 140 (**"AIS 140"**). This is a set of standards published by the Automotive Research Association of India (**"ARAI"**) and mandates that vehicle-tracking devices and emergency buttons must exist in all existing, and new, public service and commercial vehicles. The Government of India (**"GOI"**) has also directed all State Regional Transport Offices (**"RTOs"**) to ensure that all passenger buses and commercial vehicles conform to this standard. Non-compliance of this mandate can result in the suspension, or even cancellation of registration of the vehicle.[20] AIS 140 has led to an increase in demand for the manufacture of GPS tracking telematics in India. So far, apart from AIS 140, there exists no other framework that lays down regulations and/ or an enforcement regime for telematics in the country.

In another initiative, the government proposes to make the whole nation free from toll plazas. However, this does not mean that toll tax will no longer be required to be paid. Instead of physical checkpoints, GPS tracking systems installed in vehicles will automatically enable the collection of toll taxes[21].

Telematics systems are being utilized by major OEMs in a number of initiatives. One

such initiative is the 'She Taxi'. This is a collaboration between Maruti Suzuki Ltd. and the Kerala State Women's Development Corporation to enable women to reach their destination safely[22]. Taxis for the 'She Taxi' fleet have been designed with integrated internet and mobile based convergent technologies, which detect, monitor, and track movements of passengers as well as drivers driving the vehicle.

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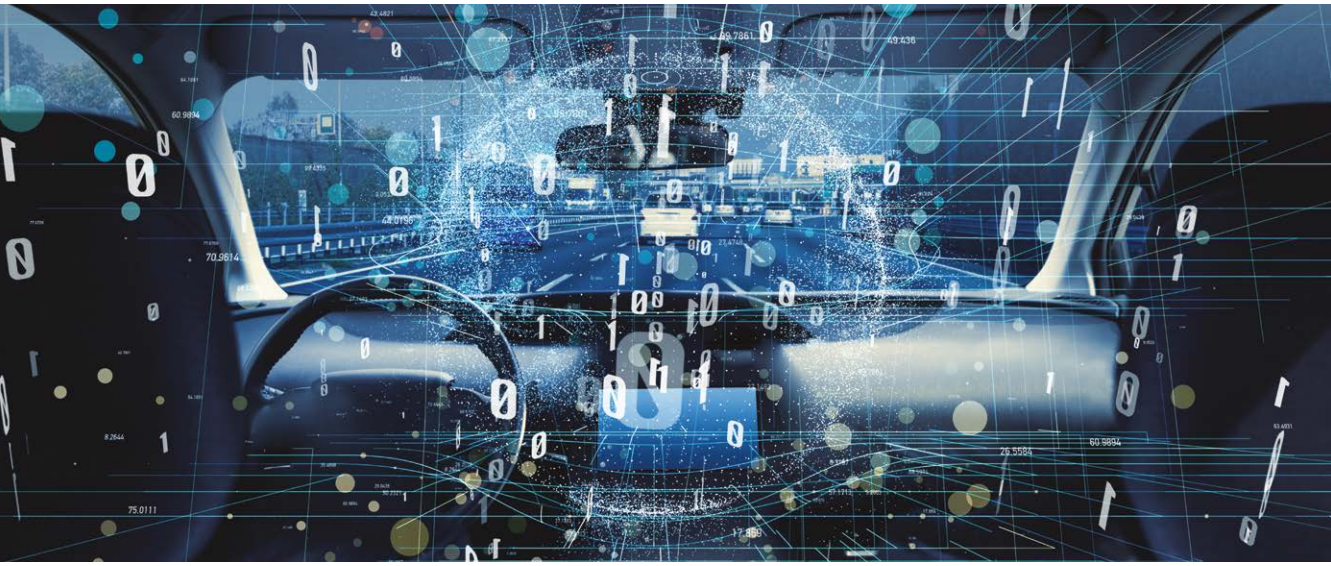
The increase in demand for telematics technology in India has witnessed start-ups such as LocoNav, Trak N Tell, BluArmor, AVIN Systems, CarSense, Inspekt Labs, amongst others[23]. There have also been a few M&A activities in the sector such as the acquisition of Intellicar[24] by TVS Motor Company, and the acquisition of Heuristics Info Systems by MSD Telematics[25].

Intellicar uses an IoT run platform, coupled with analytics and data management capabilities, to provide advance fleet management services. This acquisition is believed to accelerate ongoing digital initiatives at TVS Motor that are targeted at delivering enhanced customer experience. Similarly, the acquisition of Heuristics by MSD Telematics shall help it in vehicle tracking, building a mobile application software and providing cost effective solutions to various industry segments.

As mentioned earlier, given the large and varied data sets generated and collected through telematics, privacy concerns in terms of data storage and transfer of data to third parties for data processing are issues that need to be addressed. The Personal Data Protection Bill, 2019 (PDP Bill), the proposed personal data protection law in India, is capable of addressing some of these potential concerns. For instance, the requirement for data localization under the PDP Bill mandates the storage of sensitive personal data, such as, financial data, health data, official identifier, caste or tribe/religious or political belief or affiliation, etc. within India which can be transferred outside India for processing only under certain strict conditions. The PDP Bill, once it is enacted, will govern several aspects of privacy, interestingly one of the most relevant data sets collected by the telematics system i.e., location data does not fall within the ambit of personal data or sensitive personal information. Moreover, even the current Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules, 2011 do not cover location data within their ambit. As such, the current privacy framework will need to be made more robust to address issues arising from telematics.

Conclusion

On account of changes in consumer demand and recent government directives, it is likely that telematics systems will become an industry-wide OEM standardization in the next few years in India. Additionally, it is expected that the Indian telematics market will witness the entry of foreign participants, and a number of mergers and acquisitions are also expected in the near future. Currently, approximately 41% of the market is divided amongst the top 3 players and the remaining 59% is split between local telematics service



providers and OEMs[26]. However, as with any new technology market, market shares are yet to be crystallized. Newer applications of telematics systems, and fluctuations in market dynamics as the sector begins to draw significant interest from GOI, big-tech companies and foreign participants are to be expected.

Please refer to the next article in this series,
"Riders on the Storm: Will Collaboration be the Elixir for the Automotive Industry?"
for insights on what parties should be aware of before hopping on the collaboration bandwagon.

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ENDNOTES

1 Amit S Holey, "The Opportunity for After-Sales Revenues", Automotive, Wipro, ps://www.wipro.com/automotive/telematics/, (Accessed on June 5, 2021).

2 Hans-Werner Kaas, Andreas Tschiesner, Dominik Wee, and Matthias Kässer, "How carmakers can compete for the connected consumer", Automotive and Assembly Insights, Mckinsey & Company, last modified September 1, 2015, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/how-carmakers-can-compete-for-the-connected-consumer, (Accessed on February 23, 2022).

3 Shafiq Dharani, Tom Isherwood, Diego Mattone, and Paolo Moretti, "Telematics: Poised for strong global growth", Automotive and Assembly Insights, Mckinsey & Company, last modified April 11, 2018, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/telematics-poised-for-strong-global-growth, (Accessed on February 23, 2022).

4 Shafiq Dharani, Tom Isherwood, Diego Mattone, and Paolo Moretti, "Telematics: Poised for strong global growth", Automotive and Assembly Insights, Mckinsey & Company, last modified April 11, 2018, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/telematics-poised-for-strong-global-growth, (Accessed on February 23, 2022)

5 Hans-Werner Kaas, Andreas Tschiesner, Dominik Wee, and Matthias Kässer, "How carmakers can compete for the connected consumer", Automotive and Assembly Insights, Mckinsey & Company, last modified September 1, 2015, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/how-carmakers-can-compete-for-the-connected-consumer, (Accessed on February 23, 2022).

6 Medium Commercial Vehicle an Emerging Segment in India's Commercial Vehicles Telematics Market– 6Wresearch", Market Intelligence Solutions, Wordpress, https://6wresearch.wordpress.com/2016/11/14/india-commercial-vehicle-telematics-market-2016-2022-6wresearch/, (Accessed on June 4, 2021).

7 Inshaal Badar, "The emergence of Telematics in India", Compliance, Geotab, last modified July 19, 2019, https://www.geotab.com/blog/telematics-in-india/, (Accessed on February 23, 2022).

8 "India Telematics Market Expecting 25% YoY Growth", Global Fleet, Automotive Fleet, last modified August 18, 2020, https://www.automotive-fleet.com/10124017/indian-telematics-market-expecting-25-yoy-growth.

9 Pranshu Gupta, "Telematics - A revolution for the Indian Auto Industry", last modified June 15, 2021, Telematics: Opinion: Telematics – A revolution for the Indian auto industry, Auto News, ET Auto (indiatimes.com), (Accessed on February 23, 2022).

10 Shafiq Dharani, Tom Isherwood, Diego Mattone, and Paolo Moretti, "Telematics: Poised for strong global growth", Automotive and Assembly Insights, Mckinsey & Company, last modified April 11, 2018, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/telematics-poised-for-strong-global-growth, (Accessed on February 23, 2022).

11 Andy Greenberg, "Hackers Remotely kill a Jeep on the Highway", Security, Wired, last modified August 21, 2015, http://www.wired.com/2015/07/hackers-remotely-kill-jeep-highway/, (Accessed February 23, 2022).

12 Hans-Werner Kaas, Andreas Tschiesner, Dominik Wee, and Matthias Kässer, "How carmakers can compete for the connected consumer", Automotive and Assembly Insights, Mckinsey & Company, last modified September 1, 2015, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/how-carmakers-can-compete-for-the-connected-consumer, (Accessed on February 23, 2022).

13 "Android auto", Android, accessed June 5, 2021, https://www.android.com/intl/en_in/auto/.

14 "CarPlay", Apple, accessed June 3, 2021, https://www.apple.com/in/ios/carplay/.on

15 Vikram Chaudhary, "Smart Trucking: Why usage of Telematics in trucks is increasing", Auto, Express Drives, last modified March 22, 2021, https://www.financialexpress.com/auto/commercial-vehicles/smart-trucking-why-usage-of-telematics-in-trucks-is-increasing-tata-ashok-leyland-vecv-dicv-volvo-connected-trucks/2217507/, (Accessed on February 23, 2022).

16 Vikram Chaudhary "Smart Trucking: Why usage of Telematics in trucks is increasing", Auto, Express Drives, last modified March 22, 2021, https://www.financialexpress.com/auto/commercial-vehicles/smart-trucking-why-usage-of-telematics-in-trucks-is-increasing-tata-ashok-leyland-vecv-dicv-volvo-connected-trucks/2217507/, (Accessed February 23, 2022).

17 Garima Mathur, "Automotive in India: Live from Telematics India", Automotive, Western Digital Blog, last modified September 5, 2017, https://blog.westerndigital.com/automotive-india-live-telematics-india/, (Accessed on February 23, 2022).

18 "Onelap Telematics announced its association with VIVO India as a GPS tracking service provider", Articles, Business Standard, accessed June 5, 2021, https://www.business-standard.com/content/specials/onelap-telematics-announced-its-association-with-vivo-india-as-a-gps-tracking-service-provider-120120301145_1.html, (Accessed on February 23, 2022).

19 Joann Muller, "What Tesla knows about you", Axios, last modified March 13, 2019, https://www.axios.com/what-tesla-knows-about-you-1f21d287-a204-4a6e-8b4a-0786b0afac45.html, (Accessed February 23, 2022).

20 Devisha Singh, "All you need to know about AIS 140 GPS Tracking System for School Buses", September 25, 2019, https://yellow.live/blog/all-you-need-to-know-about-ais-140-gps-tracking-system-for-school-buses, (Accessed on March 1, 2022); and Nikhitha Kola, "8 Fascinating Things you need to know about AIS 140!", April 2, 2020, https://iotrl.io/8-fascinating-things-you-need-to-know-about-ais-140/#:~:text=According%20to%20the%20Automotive%20Industry,laid%20down%20by%20the%20standard, (Accessed on March 1, 2022).

21 "What is the future of Telematics in India?", Artcile NewsX, accessed June 21, 2021 https://www.newsx.com/science-and-technology/what-is-the-future-of-telematics-in-india.html, (Accessed on February 23, 2022).

22 Pranshu Gupta, "Telematics - A revolution for the Indian Auto Industry", Auto News, ET Auto, last modified January 30, 2017, https://auto.economictimes.indiatimes.com/news/aftermarket/opinion-telematics-a-revolution-for-the-indian-auto-industry/56874152, (Accessed on February 23, 2022).

23 "Connected vehicles startups in India", Tracxn, last modified June 14, 2021, https://tracxn.com/explore/Connected-Vehicles-Startups-in-India, (Accessed on February 23, 2022).

24 Binu Paul, "TVS Motor company acquires IoT startup Intellicar", Technology, Techcircle, last modified December 3, 2020, https://www.techcircle.in/2020/12/03/tvs-motor-company-acquires-iot-startup-intellicar, (Accessed on February 23, 2022).

25 Vaun Arora, "MSD Telematics acquires vehicle tracking solutions firm Heuristics Info Systems", Technology, Techcircle, last modified January 18, 2017, https://www.techcircle.in/2017/01/18/msd-telematics-acquires-vehicle-tracking-solutions-firm-heuristics-info-systems, (Accessed on February 23, 2022).

26 "India Telematics Market Expecting 25% YoY Growth", Global Fleet, Automotive Fleet, last modified August 18, 2020, https://www.automotive-fleet.com/10124017/indian-telematics-market-expecting-25-yoy-growth.


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FEATURE

Riders on the Storm:
Will Collaboration be the Elixir for the Automotive Industry?

Hemant Krishna

"I'm tired of being carried around in Henry Ford's vest pocket," John Dodge, who was one-half of the Dodge Brothers, once said on his stormy relationship with his biggest customer for a long time. The Dodge Brothers were not only among the earliest investors in the Ford Motor Company, but also supplied, through the Dodge Brothers Company, a huge chunk of the components required in the cars that were "manufactured" by Ford. According to some estimates, sixty percent of the total value of the Ford cars built between 1903, when Ford was founded, and 1914, when the Dodges ended their contract with the company, was supplied by the Dodges. Yet the relationship between the Dodges and Henry Ford was anything but smooth. In fact, the Dodges and Henry Ford, and his company, were even involved in a court battle 1919. The matter came to a head before the Michigan Supreme Court, on the issue of whether shareholders can force a company and its management to increase the cost of a product, and limit the money invested into expansion, so that shareholders can be paid larger dividends. The court answered in the negative, and laid down the "business judgment doctrine" which states that courts must not interfere with business judgments regarding the price of products and decisions about business expansion.

Self-reliance is now an Anachronism

The travails of this, and other unsuccessful collaborations, may have sparked Henry Ford's frenetic pursuit of self-reliance for his company in the years to follow. This culminated in the company manufacturing nearly every part of the vehicle, including the raw glass and steel that went into it. Fast forward to 2019, Ford and Volkswagen announced a furthering of their global alliance by collaborating as major investors in Argo AI, an autonomous driving technology company, co-founded by former veterans at Google and Uber's automated driving programs. Earlier this year, Ford and Google announced a six-year deal for in-car connectivity and cloud services. After the deal was made public, Jim Farley, the Chief Executive Officer of Ford, said to the press, "One of the most important parts of our strategy is to partner" [1], marking a complete reversal of the approach followed by the company's illustrious founder. In late 2019, before the pandemic put paid to their plans, Ford announced that it would create a joint venture (JV) with Mahindra & Mahindra to develop, market and distribute Ford vehicles in India, and Mahindra vehicles in high-growth emerging markets around the world. The embrace of

ARTICLE IN FOCUS

The auto sector has come a long way since the time Ford proudly positioned itself as an almost fully self-reliant company. Collaboration has been a standard fixture in the evolution of most of today's auto majors. The race towards electrification of automobiles, however, marks a more sudden transformation of the mobility landscape and it is forcing collaborations even among players who have historically been rivals. But what should parties be aware of before hopping on the collaboration bandwagon?

collaboration by the auto giant that was once famously against it underlines the inevitability of collaboration among automotive players of the world today.

India Auto Inc on a Collaborative Course

In India too, collaboration and acquisitions among automakers have become the norm, rather than the exception, with EV-centric partnerships leading the trend. Mahindra Electric has invested in, and partnered with, the vehicle rental platform Zoomcar, which counts Ford Smart Mobility among its other investors. Ola has acquired an Amsterdam-based electric scooter company Etergo BV. Bharat Forge has formed a JV with Germany's Refu Electronik GmbH for development and manufacture of electric vehicle components. Hero MotoCorp is partnering with Harley Davidson to sell and service Harley-Davidson motorcycles and accessories. Mahindra Electric has entered into a partnership with Amazon India to add electric vehicles to the latter's fleet. So, what is driving collaboration at this unprecedented pace?

The Indian automotive industry is currently going through a particularly challenging phase. The pandemic has scrambled long-established supply chains, relied on by original equipment manufacturers (**OEMs**) for decades. The Society of Indian Automobile Manufacturers, not long ago, claimed that the automobile sector in India is going through a long-term, structural and deep slowdown. Traditional OEMs are grappling with multiple forces of change all at once: electrification, ride-sharing, new connectivity technologies, autonomous driving, and the list goes on. In the past, the strategy dictating investments and acquisitions of OEMs was simple: expand to new geographies or fill up gaps in the prevailing business model by acquiring new capabilities. Likewise, if the business of an OEM was not performing as expected, selling non-performing assets could help cut losses. But now, factors such as the need for a new technology, a regulatory ultimatum on meeting emission norms, security considerations, and a growing demand for in-car services of various kinds are compelling OEMs to collaborate. The current president of Toyota Motor Corporation, Akio Toyoda, spoke for many leading automakers of the world when he said that Toyota's competitors no longer just make cars, and that companies like Google, Apple and Facebook are the ones that he thinks about at night. It would not be an exaggeration to say that the pivot point of this rapidly changing automotive landscape is the electrification imperative.

The Enduring Appeal of the JV

For several decades, for automakers, collaboration meant entering into a supply

agreement: usually for spares, and occasionally, for services or technology. The modern-day approach to collaboration, on the other hand, is centred around investment, acquisition and partnership. Today's OEMs do not shy away from even setting up venture capital funds for investing in new-age technology start-ups to future-proof their businesses. The considerations that drive decisions on investments and acquisitions are similar across sectors. However, the predominant mode of collaboration in the auto-industry today is the JV. Maruti Suzuki, a former JV between the Government of India and Suzuki of Japan, is perhaps the most famous JV in the Indian automobile sector, and one of the most famous JVs to have taken shape in India. The tight grip that Maruti Suzuki has maintained on the *numero uno* position in the passenger vehicle segment in India for decades, and the recent unravelling of the JV behind it, makes for a fascinating case study. But Maruti Suzuki is hardly the only JV of note in the auto sector in India. Automakers find the prospect of diversification of business through JVs too tempting to resist: the result is that most automobile OEMs active in India have either entered into new JVs, or walked out of JVs in the last decade. The JV is often the perfect solution for two parties, which have complementary capabilities, and are looking to benefit from each other's unique strengths. The motive behind a JV can be to gain access to new capabilities, strengthen presence in an old market, add a product line to the existing bouquet of a company's offerings, or to simply cut production costs. JVs are also the preferred mode of collaboration among foreign players who want to partner with local companies to get a foothold in the Indian market, or get access to new technologies being developed here.

Today's OEMs do not shy away from even setting up venture capital funds for investing in new-age technology start-ups to future-proof their businesses.

JVA or a JDA?

Often, when two parties wish to collaborate with only a few broad objectives in mind, they may consider executing a joint development agreement (**JDA**) rather than entering into a comprehensive joint venture agreement (**JVA**).

Joint Venture Agreement	Joint Development Agreement
• Collaboration involves significant overheads • Often requires large volumes of committed capital • Parties usually commit exclusively to the partnership and must undertake in-depth diligence to understand each other before starting the venture • Parties should be committed to clearly defined outcomes over the mid-to-long term • Exit mechanisms can be complex and may require third-party participation, or even governmental intervention	• Collaboration possible under a limited framework • Lower-to-moderate price tag, acceptable to price-sensitive customers, with larger sales volumes • Provides flexibility to Parties to understand each other while working with other collaborators, through non-exclusive relationships • Can be a pre-cursor to a JVA when Parties are still unsure about the outcomes they want to achieve by collaborating • Easier to exit since there is usually no corporate entity to wind-up

However, if resources are not a challenge and there is mutual trust between the partners, the JVA should be the obvious choice for a long-term collaboration. Clarity on the resources to be committed by each party, a deep understanding of mutual capabilities, alignment on the allocation of liabilities and consensus about the opportunities to be pursued through the JV form the basic underpinning of a JV contract negotiation.

Safely Navigating a JDA or a JVA

Typically, prior to negotiating a JDA or a JVA (each, a **Collaboration Agreement**), parties should enter into a non-disclosure arrangement (**NDA**) so that both parties extend confidential treatment to each other's trade secrets and proprietary information. The NDA should contain provisions to ensure that confidential information shared by a party with the other party is used strictly in achieving the outcomes outlined in the Collaboration Agreement, and is not misused if the parties fail to agree on a substantive contract subsequently. In the context of a JDA, if the parties have a very loose understanding of the scope of the collaboration, it is advisable to have a set of general terms and conditions that govern the overall relationship between the parties and build in a mechanism for execution of separate statements of work to pursue any specific projects or milestones. A Collaboration Agreement should always be tailored to the specific objectives of the parties in each case and, therefore, it is not possible to generalise the elements that should be contained in a Collaboration Agreement. In every Collaboration Agreement, it is crucial to:

- spell out the rights and responsibilities of the parties,
- identify each party's commitment in terms of investment and contribution of technology and resources,
- define the milestones to be achieved and the timelines by which they should be achieved,
- specify the ratio and mechanism of sharing the costs and profits,
- provide for a schedule of meetings to monitor progress and take significant decisions that will influence the project outcomes, and
- allocate intellectual property rights.

Intellectual Property in Collaborations

Intellectual property is a hot-button issue in most technology-heavy collaborations. Typically, the intellectual property owned by a party prior to the Collaboration Agreement becoming effective continues to remain with such party, but some of it may have to be licensed to the other party, or the JV entity, for the purpose of the collaboration. However, the provisions of a Collaboration Agreement that deal with intellectual property generated during

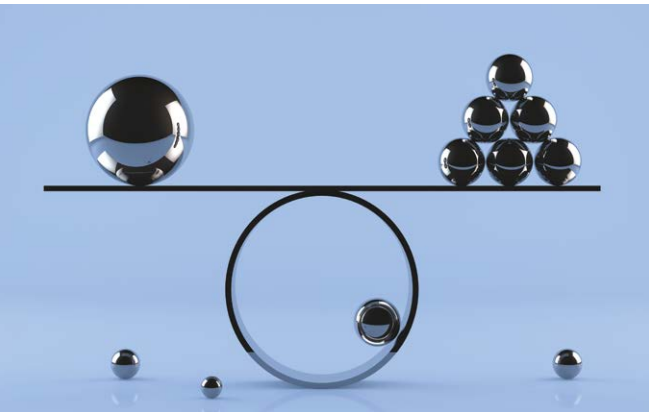
the term of the collaboration (**Developed IP**) should be drafted carefully, to provide for a multitude of scenarios. Where automotive OEMs enter into Collaboration Agreements with technology companies, if the Developed IP is technological, the technology partner may argue that the OEM, or the JV entity, should not have ownership rights over such Developed IP, since it would have resulted predominantly from the efforts of the technology partner. So, the OEM should find a way to ensure that the technology partner is adequately incentivised to share rights over the Developed IP when the contribution of the technology partner is likely to outweigh their own. The OEM can consider acquiring a right of first offer, or refusal in relation to any transfer of Developed IP by the technology partner. Where two parties are likely to make comparable contribution to the Developed IP, it is common to have 'joint ownership' so that either both the parties jointly own the Developed IP, or the JV entity owns it. Parties often imagine that such joint ownership is fair and simple. In reality, the joint ownership model is frequently at odds with the interests of a party that has a more critical need of the Developed IP, since both parties will have to act in tandem to obtain protection for the Developed IP, transfer rights over the Developed IP or defend the Developed IP from infringement. Even in a JVA where these rights are held by the JV entity, the JV partners may each have a veto right on such decisions, which may complicate the exercise of these rights. In certain JV scenarios, it may be appropriate to provide for either of the JV partners to unilaterally activate rights of the JV that serve the interests of the JV entity.

Matters of Competition & Exclusivity

Non-compete provisions, which restrict a party from competing with the other party, and exclusivity arrangements, which prohibit a party from engaging with the competitors of the other party, are issues that require much deliberation when negotiating a Collaboration Agreement. It may be easier to arrive at a model for non-compete and exclusivity that is satisfactory to all parties where there is parity between the contributions to be made to, and the potential gains from collaboration, for all parties involved. In such cases, the opportunities that are proposed to be pursued through the collaboration can be made 'exclusive' so that both parties may either pursue them jointly or through the JV entity, as applicable. If such parity is absent, non-compete and exclusivity clauses will have to be carefully calibrated to reflect the precise expectations of the collaborating parties. A full-fledged auto-manufacturing business has a multitude of dependencies, ranging from core components and accessories to infotainment. At the same time, an eclectic auto business may be connected to a whole range of other businesses through a web of subsidiaries, affiliates, and investors. This makes it all the more challenging for auto companies to sign up for non-compete and exclusivity arrangements. For nascent start-ups, such as those in the EV space, agreeing to exclusivity with a large OEM may seem like an easy proposition at first, but in due course may become limiting.

It may be easier to arrive at a model for non-compete and exclusivity that is satisfactory to all parties where there is parity between the contributions to be made to, and the potential gains from collaboration, for all

It would therefore be prudent to carefully weigh future repercussions of non-compete and exclusivity clauses, and pare down the scope of such provisions such that they apply for limited periods of time, and only as long as a party's dependencies are adequately serviced by the party that seeks to enforce such provisions. Affiliates, subsidiaries and other related parties should be left out of the ambit of such provisions.



Governance & Exit Clauses

In JVAs, there are at least two additional complexities to be addressed, namely, governance and exit. Depending on whether the JV entity will have a dedicated management team, the JVA should address how the management team will be constituted, and the mechanics of decision-making by the management of the JV entity. Decision-making models in JVs often mimic the ratio of the stakes of the partners in a JV, but not always. Where decision-making relies on unanimity, deadlock-resolution provisions assume significance. Likewise, exit provisions are indispensable in a JVA. Parties who do not have the appetite for discussing exit provisions at length at the time of negotiating a JVA tend to gloss over them, but the possibility of a JV partner wanting to transfer its interest in the JV, or assign its rights in the JV to an affiliate, can never be ruled out. A far-sighted JVA should also offer guidance on the circumstances under which the JV should be liquidated, the possibility of inducting new parties into the JV and the conditions under which the JV's shares may be listed on a stock exchange.

Although the intent and vision of the partners in a collaboration play the most important role in deciding the fate of a JV, a robust Collaboration Agreement ensures that the risks of a breakdown are hugely mitigated.

Towards a Brave New Future

With the advent of EVs, telematics, platform services, ride-sharing and alternative sources of energy, the automotive sector finds itself on the cusp of a revolution. Governments in pursuit of climate action targets may also throw a few curveballs at the industry from time to time. Against this setting, bolder players in the market are increasingly seeing collaboration as a guardrail in negotiating their way into a future that promises many a wild ride.

Hemant Krishna is a Partner at the firm.

ENDNOTES

1 'Ford and Google sign six-year deal for in-car connectivity and cloud services', CNBC, available at https://www.cnbc.com/2021/02/01/ford-and-google-sign-six-year-deal-for-android-in-car-apps-cloud.html, (Accessed on February 15, 2022).

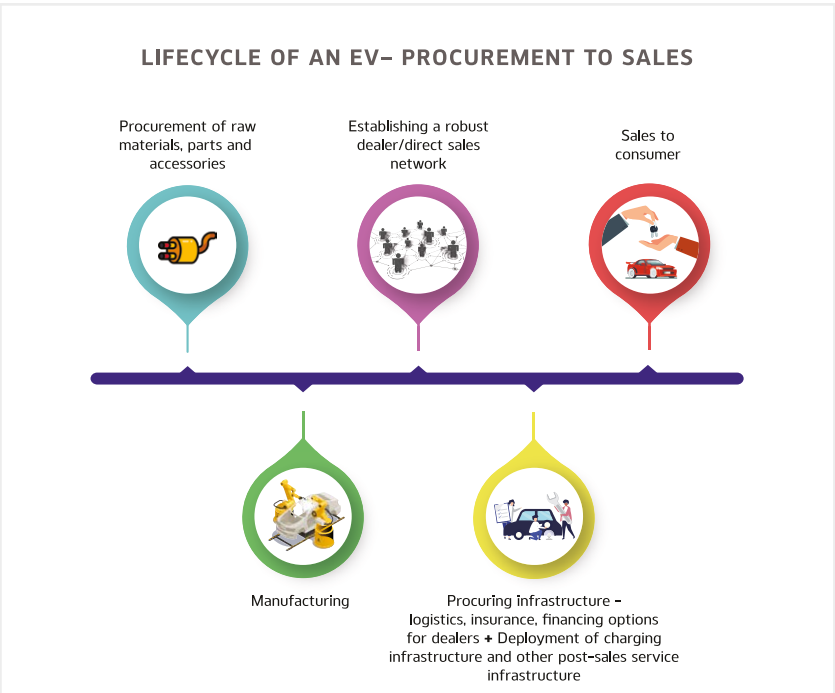
FEATURE

Commercial Contracts for the Passenger Electric Vehicle Industry: Key Commercial and Legal Issues to Consider

L. Badri Narayanan and Pooja Vijayvargiya

The Electric Vehicle (**"EV"**) business in India has gained momentum in recent years, owing to increased environmental awareness and a constant push by the government. While government-induced factors, such as purchase linked subsidies, tax concessions, state industrial incentives and policy decisions have played a key role in the rise of the EV market in India, success of EVs in India would also depend on how dynamics between key stakeholders in the EV business – from OEMs to end consumers - play out.

Typically, in a business cycle of EV manufacturing, key stakeholders comprise of OEMs, dealers, end users and third-party providers for support services. A few important commercial and legal factors that play a vital role in negotiating commercial contracts with these stakeholders are discussed below:



ARTICLE IN FOCUS

To cater to the increasing demand of two-wheeler EVs in India, manufacturers are exploring commercial arrangements with dealers across the country to expand the market for their products. Dealership networks in India may be enhanced through partnership or collaboration with an established domestic dealership network, or the creation of a new network altogether. Either way, success of any commercial negotiation between manufacturers and dealers would require the parties involved to delve into commercial and legal aspects of transacting business, such as exclusivity of dealership, framing of an incentive plan, logistics and transfer of risk in products transported, building appropriate indemnities and warranties in the contract, amongst others. A necessary consequence of a boost in manufacturing and sales of EVs would be a simultaneous increase of commercial negotiations in other areas, such as procuring insurance, logistics, etc. Additionally, since creation of a robust charging infrastructure would be the key to success of EVs in India, manufacturers and dealers would look to explore newer models for creation of charging infrastructure.

This piece explores some key commercial transactions that occur in the EV space, and the commercial and legal considerations that must be borne in mind by stakeholders when negotiating such transactions.

Highlights of Dealer-Manufacturer Transactions

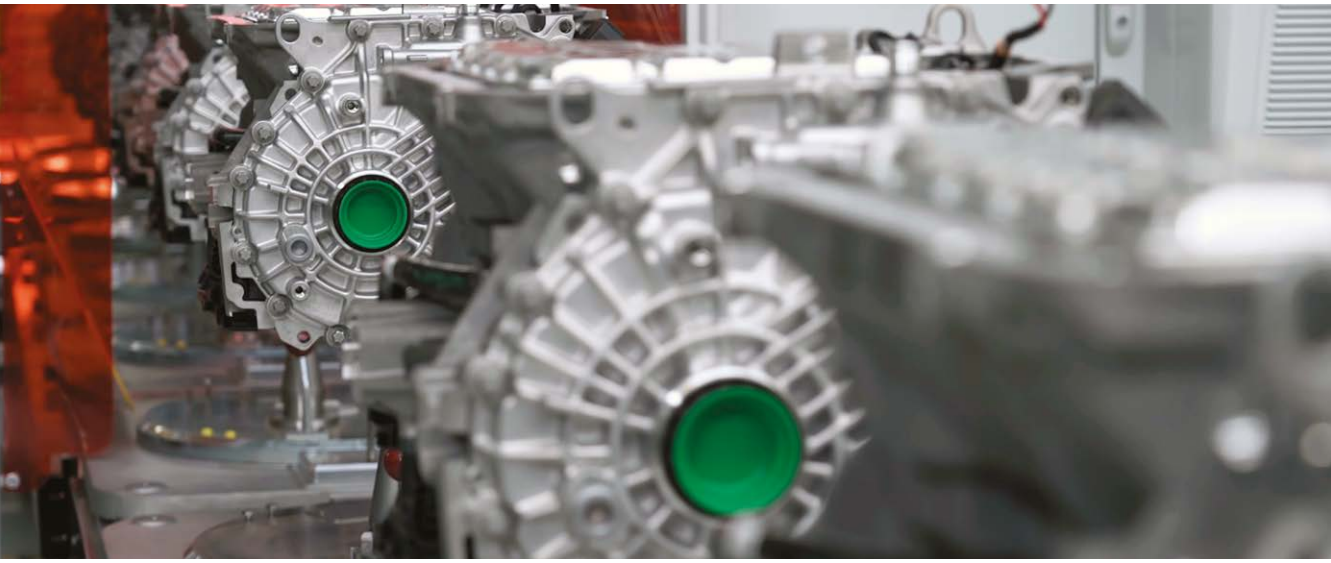
The establishment of a countrywide robust dealership network has been a driving factor in the success of most automotive business in India. While the initial trend in EVs was to set up manufacturer-owned outlets or 'experience centres', as demand increases, it has become essential for manufacturers to reach customers through alternate channels of dealership networks.

EV dealerships require a high investment cost and risk appetite, with limited sales initially. Thus, EV manufacturers tend to prefer expanding sales through established dealership network of ICE vehicles, who possess sufficient capital, and risk bearing capacity. Additionally, this allows EV manufacturers to tap large consumer bases associated with existing dealerships of ICE vehicles at local levels.

While this model may mean lesser risk with a large consumer outreach for manufacturers, a thorough financial and legal due diligence of a prospective dealer must be considered. This helps to rule out stumbling blocks such as potential conflicts with other brand owners or manufacturers, substantial liability which may cause adverse financial impact, or impact the brand's goodwill. Further, it should also be ensured that appropriate representation, warranties and indemnities are obtained from dealers in dealership agreements for any non-compliance with applicable laws, such as anti-money laundering laws, motor vehicle laws or other possible challenges. With new dealers, however, ownership of trade names used must also be verified, and suitable indemnities built into dealership agreements to this effect.

Expanding sales through an established dealership network may have its advantages for manufacturers. This also means that bargaining power is tilted in favour of dealers. Having taken the risks and costs associated with an EV dealership, dealers demand extended exclusivity in sales of EVs from manufacturers in terms of larger geographical area and longer time periods. Extending such exclusivity may be a sound decision commercially, but it may be seen as restrictive of free competition in the EV market by limiting consumer choice. Further, given that the EV market will only expand in coming years with an increase in dealers, manufactures must ensure that exclusivity clauses are drafted in a manner compliant with the principles laid down in Indian competition law to safeguard against future disputes.

Apart from the above, dealers may demand that manufacturers bear in-transit costs and risks associated with delivery of vehicles to dealers' outlets or warehouses. Given that new manufacturers may not have upgraded supply chain infrastructure to match



that of mature players of the ICE space, the cost of procuring logistics from third parties, and associated insurance will be high. Thus, it is imperative that dealership agreements clearly spell out the terms for sale and delivery of vehicles, and the party who shall bear costs of transportation along with risk to vehicles in transit.

Given that the EV market has been heavily affected by the on-going pandemic and extended lockdowns, force majeure clauses can be invoked to suspend performance of a party's obligation under a dealership agreement, or even terminate the agreement. Therefore, it is necessary that *force majeure* clauses are carefully drafted to do away with ambiguities. 'Force majeure' events and the period of suspension of a party's obligations should be clearly stated. Additionally, with reduced sales during a force majeure event, manufacturers should consider leveraging such circumstances as an exception to general exclusivity granted, to a dealer under a dealership agreement, and explore alternate avenues of sales.

... *force majeure* clauses can be invoked to suspend performance of a party's obligation under a dealership agreement, or even terminate the agreement.

EV manufacturers constantly aim at establishing a chain of dealership network. However, it remains to be seen whether there are enough financial incentives for dealers to offer customers EVs over varied options of traditional automotives.

In the ICE space, amongst other factors, incentive schemes offered by manufacturers often influence decisions of dealers to opt for a particular brand. The volume of incentives offered to dealers can be a driving factor to boost purchases by dealers, in this developmental stage of the dealership network of EVs. Traditionally, dealer incentive schemes comprised of incentives based on sales volume, purchase volume and performance-based incentives. These incentives go hand-in-hand with point of sales incentives offered to consumers such as festival and season discounts, discounts to selected category of buyers such as corporate and government purchasers, amongst others. These incentives are borne by

manufacturers and dealers in a specified ratio. Hence, such schemes go a long way to increase dealer capacities.

While negotiating term sheets with financers prior to entering into definitive financing agreements, manufacturers must assess the terms relating to a 'default' by a dealer, and subsequent recovery of debts.

Procuring Dealer Financing

While established dealer networks may have low financing requirements, procuring finance for new dealers may be a challenge for EV manufacturers. Banks and NBFCs may often charge high interest rates, and require stringent compliance and reporting standards for dealer financing arrangements. While negotiating term sheets with financers prior to entering into definitive financing agreements, manufacturers must assess the terms relating to a 'default' by a dealer, and subsequent recovery of debts. It is especially important that before committing to a dealer financing program, the extent of 'default' is carefully examined by manufacturers, as a manufacturer is usually obligated to stop vehicle supply to a defaulting dealer, which may directly impact the sales of EVs.

... transportation agreements should clearly spell out events contained in indemnities provided by a transporter, and the risks insured by the insurer, so that there is minimal financial loss in an event of damage to cargo.

Procuring Logistics and Insurance

New manufacturers of EVs are highly dependent on third party logistics for lack of advanced supply chain infrastructure. Further, high value cargo and longer distances results in higher transportation and insurance costs. Hence, transportation agreements need to be drafted in tandem with insurance contracts. Such transportation agreements should clearly spell out events contained in indemnities provided by a transporter, and the risks insured by the insurer, so that there is minimal financial loss in an event of damage to cargo. It is also essential to examine caps to indemnities by transporters transportation agreements. This determines whether indemnities need to be capped to a fixed amount or to the extent of shortfall in insurance claim amount. Any such limits on transporters' indemnities must also be taken into account while negotiating insurance premiums with insurance companies, to maximise coverage. To avoid procedural delays in processing insurance claims, manufacturers must define the legal process for such claim recovery - starting from the invoking of a claim of damage with the transporter, to final payments from the insurance company. This will go a long way in ensuring minimal monetary leaks in transporting vehicles to warehouses and retail outlets.

Transportation contracts should also account for indemnities to be provided by a transporter for non-compliance of laws by the transporter's personnel, and the manufacturer's liability on failure to furnish legal documents requirement for smooth transit, such as invoices and e-way bills which may lead to interception of cargo and

vehicles.

Consumers and Sales

To ease the processing of subsidies under FAME-II and other policy incentive schemes, buyers need to provide accurate information at the time of purchase of EVs. Furnishing of incorrect information may result in forfeiture of subsidy. Hence, the extent of liability of manufacturers in such instances must be clearly enunciated in agreements with buyers. Additionally, such agreements should also define terms of limited licensing of technology in EVs to users, consent for collection of data by manufactures, and indemnities from buyers for violating these terms, as also laws such as motor vehicle laws.

Procurement and Associated Challenges

EV manufacturing in India relies heavily on imports for battery management systems and local procurements of other components. This leads to additional challenges for manufacturers.

Issues include the supply of tooling (moulds and jigs) and the extent of warranty on components. Indemnities provided by OEMs for loss of life or injury to the ultimate buyer due to faulty components must always be addressed. This is a critical factor for negotiation between OEMs and EV manufactures in local procurements, with the former unwilling to provide extended warranties and indemnities. Innovative trends in component manufacturing such as components with customised warranties, and packaged solutions of supply of components with servicing further complicate this dynamic.

Appropriate provisions need to be built into procurement agreements with accessory suppliers to clearly demarcate the ownership of technology and limitation of liability in case of violation of terms of use of technology by buyers.

EV manufactures are always on the look-out for attractive ways to market EVs in India by offering innovative accessories like smart helmets and customised add-ons compatible with EVs. It is therefore essential that these products are checked for compliance with applicable laws. Appropriate provisions need to be built into procurement agreements with accessory suppliers to clearly demarcate the ownership of technology and limitation of liability in case of violation of terms of use of technology by buyers.

Deployment of Charging Infrastructure

Apart from offering efficient batteries, success of EVs in India will depend largely on accessibility of public charging infrastructure ("CI") for users. Manufacturers have been endeavouring to increase CI by providing CI points in premises with high footfalls and usage, such as parking facilities of shopping malls, eminent housing societies, restaurants, café chains and large commercial complexes including IT parks.

Here, agreements with owners of premises need to lay out the extent of liability that each party would bear in an event that results in injury or even loss of life to users of CI, and loss of, or damage to EVs. To avoid disputes, each party must carve out the causes and events for which it is willing to assume responsibility. Similarly, consumer experience can be maximised through easy accessibility of CI. Other factors such as preferential, paid, and free entry and exit to CI premises, safeguarding of vehicles against theft or damage by third parties, should also be addressed in such agreements.

Making available CI through 'EV roaming' will also contribute to the success of EVs in India. EV roaming requires complete integration between electricity suppliers, CI manufactures, vehicle manufacturers and charging point operators to provide CI which is usable across various brands and types of EVs. This will substantially reduce the distance travelled for charging a vehicle, and also offer price-competitive choices to EV users. To implement EV roaming, complex multilateral agreements are required between stakeholders to enable seamless integration of technology, consistency in service levels, pricing mechanisms, simplified billing and easy charging. The success of EV roaming should also be reviewed in the context of Indian market realities. Some such factors include the availability of charging points suitable for all kinds of EVs, integration of data acquired from across vehicle dashboards, charging points, and mobile apps, and most importantly, an exchange of information amongst stakeholders.

As the EV business continues to evolve rapidly, with constant innovation in technology and increased competition, most of the aforesaid factors will continue to pose challenges for EV manufacturers and dealers. Hence, it is important that all parties invest time and patience in drafting contracts which cater to commercial and legal issues, to safeguard the market for EV products painstakingly built over the years.

Please refer to the previous article in this series, ***"EV Charging Infrastructure - Fueling Growth of EVs in India"*** *for more insights on charging infrastructure.*

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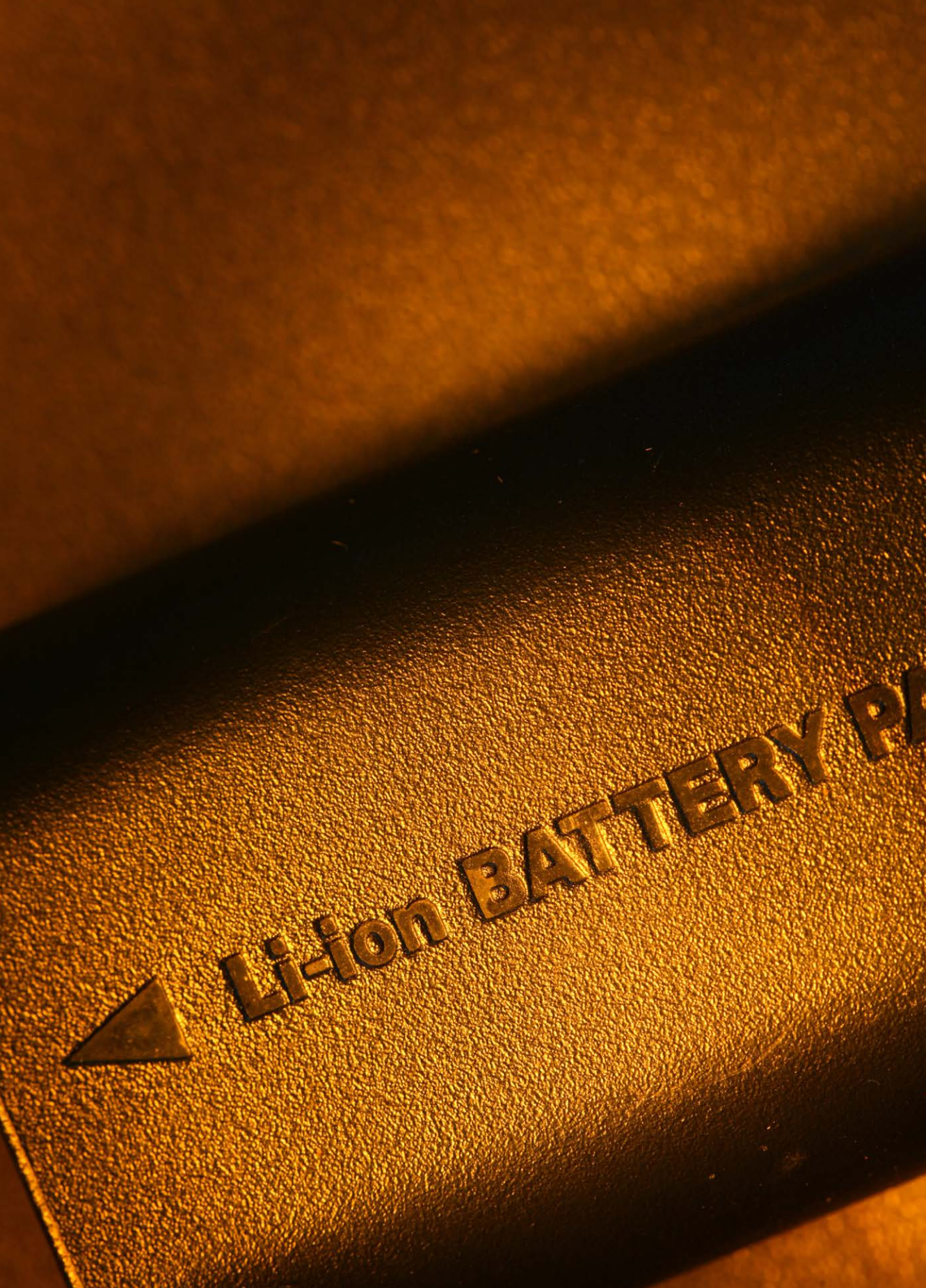
Li-ion BATTERY

FEATURE

Taxing Lithium-ion Batteries

Raghavan Ramabadran, Rohan Muralidharan and Vishvas Bharadwaj

Electrically Operated Vehicles (**"EVs"**) are considered by many to be the future of the automobile sector. Environmental hazards and the exhaustible nature of crude oil have hastened the arrival of a different automotive reality. EVs use batteries for operation, instead of conventional crude oil based fuel. Batteries are of different types such as lead, nickel or lithium-ion. There is a preference for lithium-ion batteries due to their inherent advantages over others, such as higher energy density, voltage capacity and lower self-discharge rate.

There is a preference for lithium-ion batteries due to their inherent advantages over others, such as higher energy density, voltage capacity and lower self-discharge rate.

Recognizing the need to promote EVs, Government of India has been offering various tax incentives, including income tax deduction for interest paid on vehicular loans for purchase of EVs, reimbursements of State GST by certain State Governments on supply of EVs, and the reduction of GST on EVs themselves of up to 5%.

Although EVs themselves enjoy a concessional GST rate, raw materials and services used in the manufacture of EVs continue to be taxed at higher rates (18%-28%), resulting in accumulation of credit, due to inverted duty structure[1]. As of now, lithium-ion batteries used to operate EVs are classified under HSN Chapter Heading 8507, and therefore, are subject to GST at 18%. In the authors' view, this classification is appropriate.

However, this classification may change as a result of the recent judgment of the Hon'ble Supreme Court in the matter of *Westinghouse Saxby Farmer Ltd.*, v CCE[2], wherein the classification of "electric relays" for use in railway signaling equipment was examined.

The principle laid down in this decision could result in lithium-ion batteries being subject to GST at 28%! Therefore, this article analyses the *Westinghouse Saxby* case and specifically whether lithium-ion batteries will be subject to GST at 28% as "parts of motor vehicles", or they will continue to be subject to GST at 18% as "electric accumulators".

ARTICLE IN FOCUS

Government incentives to enable the growth of the EV market needs cohesive action from all departments. Variable and high tax rates lead to high production costs for EV manufactures. Significant sums of working capital are often inaccessible due to inverted duty structures. Uniform tax incentives for components and EVs will enable ease of sale, and provide an impetus to the EV market.

The *Westinghouse Saxby* Case

Based on their exclusive use in the railways, the assessee in *Westinghouse Saxby* sought to classify "electric relays" under Chapter Heading 8608 as parts of railway signaling equipment. This claim was based on the 'sole or principal use test' enunciated in Note-3 to Section XVII[3]. The assessee argued that relays are principally designed for use with railway signaling equipment, and therefore, classifiable as "parts" of railway signaling equipment, under Chapter Heading 8608.

On the other hand, the Department sought to classify 'relays' under Chapter Heading 8536 as "electric equipment" on the ground that Note-2(f) to Section XVII specifically excluded Articles of Chapter 85 (where relays are listed) from being classified under Section XVII. It is to be noted that Note-2 excludes specified articles from classification under Section XVII, irrespective of whether they are identifiable with goods of the said Section.

With this background, the Hon'ble Supreme Court held that "electrical relays" are classifiable under Chapter Heading 8608, as follows:

- In terms of Note-3 to Section XVII, parts which are suitable for use solely or principally with an article covered under Chapter 86, cannot be classified under a different chapter.
- Note-2(f) will be applicable only to those goods which are capable of being marketed independently for use, and does not apply to parts solely or principally used with an article covered under Chapters 86 to 88.

In effect, the Hon'ble Supreme Court has held that the exclusion in Note-2(f) will not apply to items which are covered under Note-3. Without going into the correctness of the judgment, the authors believe that this decision has laid down an important proposition with widespread ramifications on classification of a wide range of products.

An inverted duty structure does allow the supplier of EVs to file refund claims for the resultant accumulation of credit. However, the same will result in blocked working capital until refund claims are sanctioned and processed.

Has the signal turned red for lithium-ion batteries after *Westinghouse Saxby*?

As stated previously, lithium-ion batteries are specifically covered under Heading 8507, and subject to GST at 18%. Generally, parts of EVs are covered under Chapter Heading 8708, and attract GST at 28%. It is worth reviewing whether the Department can make a case to levy GST at 28% on lithium-ion batteries, which are a primary component of EVs, as parts of EVs. This question assumes immense significance in light of the fact that while EVs themselves are taxed at 5%, parts of EVs are taxed at 28%. This classification is critical, as the application of GST at 28% will result in a higher quantum of credit lying unutilized due to inverted duty structure. An inverted duty structure does allow the supplier of EVs to file refund claims for the resultant accumulation of credit. However, the same will result in blocked working capital until

refund claims are sanctioned and processed.

To answer this question, it is important to understand the principle laid down in the decision. The Hon'ble Supreme Court has held that parts which are solely, or principally, used along with an item covered under Chapters 86 to 88 are classifiable under the said chapters. Therefore, it is relevant to consider if the lithium-ion batteries are designed to be used solely or principally with EVs.

Lithium-ion batteries may, in fact, have other alternative applications. They could be used to supply power to homes, offices and other commercial establishments[4]. In addition, batteries that have reached the end of their useful life for EVs may nonetheless be usefully repurposed elsewhere as a source of energy[5].

If such alternative uses of lithium-ion batteries are established, it may be possible to argue that such batteries do not satisfy the "sole or principal" use test and thus, are not "parts of motor vehicles" covered under Section XVII. However, merely demonstrating that a plausible alternative use exists is inadequate to refute such higher tax reclassification. It must further be shown that such alternative use is significant enough to conclude that the battery is **not** principally designed for automobiles.

Therefore, as long as lithium-ion batteries are designed solely or principally for EVs, and there is no evidence to the contrary, this decision provides an opportunity for the Department to argue that such batteries are parts of EVs, and therefore, attract GST at 28%. This could set back the EV sector significantly, which has already been requesting for a reduction on the rate of taxation of such batteries.

The primary cause for concern, however, is that the entirety of the potential dispute described above is a wholly unintended consequence of *Westinghouse Saxby*. When examined independently, *Westinghouse Saxby* is an assessee-friendly judgment by the Hon'ble Supreme Court on the facts of that case. It is a peculiar twist of fate that a judgment favorable to one assessee has laid down a principle, which may prove fatal to so many others, including suppliers of lithium-ion batteries.

But all is not lost. Instruction No. 01/2022 (Customs) dated 05.01.2022 is a ray of hope in the aftermath of *Westinghouse Saxby*. Briefly, the said Instruction notes that various other judgments of the SC[6]– which have suitably applied HSN Explanatory Notes to classify parts and accessories – did not come up for consideration in *Westinghouse Saxby*. Therefore, the Instruction states that it may be considered that *Westinghouse Saxby* decided the classification of relays alone, and not parts of goods falling under Chapter 87 as such. Further, it notes that the Department has filed a review petition against *Westinghouse Saxby*.

Having said this, one must remember that Departmental circulars and instructions cannot prevail over an SC judgment. Accordingly, while the said Instruction is a welcome step in the right direction, the matter is far from resolved.

Intervention by the Government of India is the best way to overcome the quagmire created by *Westinghouse Saxby* for the auto industry in general, and lithium-ion battery suppliers specifically.

The Way Forward

Intervention by the Government of India is the best way to overcome the quagmire created by *Westinghouse Saxby* for the auto industry in general, and lithium-ion battery suppliers specifically.

The decision of the Hon'ble Supreme Court has resulted in a worse position for lithium-ion battery suppliers, especially when the batteries are designed to be used exclusively with EVs. This seems to fly in the face of government initiatives to promote EVs. Potential benefits from use of EVs should encourage the Government to apply a uniform rate of 5% GST on all parts and components used in EVs, which is the same rate applicable to EVs. A perusal of the minutes of the 36th GST Council meeting held on July 27, 2019 reveals that the Council held detailed discussion on the desirability of incentivizing a shift to electric vehicles. In fact, the Council decided to drop GST rates on all electric vehicles from 12% to 5%, charging stations for electric vehicles from 18% to 5%, and exempt the hiring of electric buses carrying more than 12 passengers by local authorities from GST entirely. There is little doubt that the Government's official policy is to encourage and incentivize the growth of the electric vehicle segment.

Relying on the above factors, it may be possible to file a representation with the Government requesting for specific relief for the electric vehicle sector.

Conclusion

It is no secret that the automobile sector, including EVs, has been in dire straits recently. The COVID-19 pandemic has only made things worse for an already beleaguered industry. Considering the mammoth amount of capital investment involved, not to mention the vast legions of labor and employment, there is every reason to deem it the Government's duty to intercede and nip the impending chaos in the bud. Keeping in mind that EVs will be encouraged and incentivized as a result, there is a strong case to be made that prompt action now will pay rich dividends long into the future.

The authors would like to thank **Vishvas Bharadwaj**, *Associate* at the firm for their assistance.

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ENDNOTES

1 Binita Jaiswal, Electric Vehicle Makers Seek GST Rate Cut to Push Growth, Indian Express, January 26, 2021, (Accessed February 22, 2022), https://www.newindianexpress.com/business/2021/jan/26/electric-vehiclemakers-seek-gst-rate-cut-to-push-growth-2255195.html

2 Westinghouse Saxby Farmer Ltd. v CCE, Calcutta, [2021-VIL-33-SC-CE]

3 In terms of Rule 1 of General Rules for Interpretation, classification shall be determined according to the terms of the Headings and any relative Section or Chapter Notes. Chapter 86 to 88 are covered under Section XVII of the Customs Tariff.

4 Will Your EV Keep the Lights On When the Grid Goes Down? | Greentech Media and Audi Wants to Let Your EV Power Your Home (autoweek.com)

5 Freddie Holmes, From Plug-in Cars to Plug-in Homes – EV Batteries Get a Second Life, Automotive World, February 14, 2018, (Accessed on February 22, 2022)

6 Intel Design Systems (India) Pvt Ltd v. CCE [2008 (223) E.L.T. 135 (SC)] and CCE v. Uni Products India Ltd. [2020 (372) E.L.T. 465].

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Badri advises in the areas of corporate, tax and investment matters. He has advised various leading multinational corporations on joint ventures, acquisitions, restructurings and other commercial arrangements. He has also represented clients before various forums in tax and commercial disputes. He regularly advises clients across sectors, including, auto, healthcare and pharma, e-commerce, food and agri, online gaming, tech start-ups and financial services. He is a dual-qualified lawyer admitted to practice in India and New York. He practiced in the United States before moving to the firm.

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