

**INDIA'S EV ECOSYSTEM - AN OVERVIEW – UPDATED TO APRIL 2022**  
**compiled by The Chamber for Impex & Health with The Trinity Group from public info**

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Transportation is the cause of nearly a third of global pollution and India is the world's 5<sup>th</sup> largest automaker. The COVID pandemic, Ukraine crises and global environment commitments present India with opportunities for domestic and international markets. Global uncertainties have compelled even MNCs to offset supply-chain risks and manufacture for a region. Start-ups, market-leaders, innovators, venture capitalists with technology and solution providers are investing heavily into EVs and renewable mobility. The prices of EVs are also fast gaining reaching parity with their internal combustion engine (ICE) counterparts.

### **Will India achieve its COP26 promises?**

The 2021 United Nations Climate Change Conference, more commonly referred to as COP26, was the 26th United Nations Climate Change conference, held at the SEC Centre in Glasgow, Scotland, United Kingdom, from 31 October to 13 November 2021. The president of the conference was UK cabinet minister Alok Sharma. The COP stands for Conference of the Parties. In diplomatic parlance, "the parties" refers to the 197 nations that agreed to a new environmental pact

The COP26 summit brought parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change. The main objectives of the COP26 meeting were to: commit to more ambitious targets to reduce greenhouse gas emissions by 2030. The Pact urges the Parties to take a number of steps to reduce their GHG emissions and to reach net-zero by 2050.

In April 2019, Niti Aayog, the federal think tank, published a report titled "India's Electric Mobility Transformation", which pegs EV sales penetration in India at 70 percent for commercial cars, 30 percent for private cars, 40 percent for buses, and 80 percent for two- and three- wheelers by 2030. These targets, if achieved, could lead to a net reduction of 14 hex joules of energy and 846 million tons of CO2 emissions over the deployed vehicles' lifetime.

Electric vehicles sold until 2030 can cumulatively save 474 million tons of oil equivalent over their lifetime, worth US\$207.33 billion. This will help India fulfil its global commitments to lower carbon emissions and increase use of cleaner sources of energy and transportation as required by the Nationally Determined Contributions (NDCs) under the United Nations Framework Convention on Climate Change (UNFCCC) and EV30@30. Enabling policy support measures are a critical need at this juncture, if India has to meet its EV targets.

The Niti Aayog with the EV, Power, Renewable and related Union and State governments announced numerous initiatives to boost the EV ecosystem like higher subsidies, production-linked incentives (PLIs) for advanced chemistry cells and the auto components sector, demand incentives and even a battery swapping policy.

## **Why Foreign Investors Should Pay Attention to India's EV Ecosystem**

The electric vehicle industry in India is picking pace with 100% FDI possible, new manufacturing hubs, and increased push to improving charging infrastructure. Federal subsidies and policy favoring deeper discounts for Indian-made electric two-wheelers as well as a boost for localized ACC battery storage production are other growth drivers for the Indian EV industry. Moreover, in September 2021, a production-linked incentive scheme for the automotive sector was approved by Cabinet to boost the manufacturing of electric vehicles and hydrogen fuel cell vehicles. India reported sales of over 300,000 EV units in 2021.

According to an independent study by CEEW Centre for Energy Finance (CEEW-CEF), the EV market in India will be a US \$ 206 billion opportunity by 2030 if India maintains steady progress to meet its ambitious 2030 target. This would require a cumulative investment of over US \$ 180 billion in vehicle production and charging infrastructure. Another report by India Energy Storage Alliance (IESA) projects that the Indian EV market will grow at a CAGR of 36 percent till 2026. The EV battery market is also projected to grow at a CAGR of 30 percent during the same period.

The burden of oil imports, rising pollution, and as well as international commitments to combat global climate change are among key factors motivating India's recent policies to speed up the transition to e-mobility. The Indian automotive industry is the fifth largest in the world and is slated to be the third largest by 2030. Catering to a vast domestic market, reliance on the conventional modes of fuel intensive mobility will not be sustainable. In an effort to address this, federal policymakers are developing a mobility option that is "Shared, Connected, and Electric" and have projected an ambitious target of achieving 100 percent electrification by 2030.

The Indian EV market is basically categorized by propulsion type (Battery Electric Vehicle, Plug-in Electric Vehicle, and Fuel Cell Electric Vehicle) and by vehicle type (passenger cars, commercial vehicles, 2 wheelers, 3 wheelers, public transport, etc) and hence all stakeholders who are related to these segments make up the EV ecosystem. The Indian EV market was valued at USD 1434.04 billion in 2021 and is expected to reach USD 15397.19 billion by 2027 registering a CAGR of 47.09% during the forecast period from 2022 - 2027.

The National Electric Mobility Mission Plan (NEMMP) and Faster Adoption and Manufacturing of Hybrid & Electric Vehicles in India (FAME I and II) helped create the initial interest and exposure for electric mobility. For instance, in phase two of FAME, the government announced an outlay of US \$ 1.4 billion through 2022. This phase focuses on electrification of public and shared transportation through subsidizing, 7090 e-buses, 500,000 electric 3 wheelers, 550,000 electric passenger vehicles, and 1,000,000 electric 2 wheelers.

To promote the domestic electric vehicle industry, the Indian government has provided tax exemptions and subsidies to the EV manufacturers and consumers. As per the phased manufacturing proposal, the government has imposed 15% customs duty on parts that are used

to manufacture electric vehicles and 10% on imported lithium-ion cells. The revised duty under PMP has been proposed from April 2021.

States have also launched policies that support powertrain electrification by stimulating the demand, local manufacturing, research and development (R&D), and infrastructure development. Several states, like Delhi, Kerala, Karnataka, Telangana, and Andhra Pradesh, have formulated their own electric vehicle policies, while others are in the process of doing so. According to the Delhi Electric Vehicle Policy 2020, the government plans to have at least 50% e-buses for all new stage carriage buses and aims for 25% of the new vehicles to be electric by 2024.

In March 2021, Delhi government announced its plans to introduce an interest subvention of up to 5% for electric vehicle (EV) purchases in the state. In February 2021, Delhi government announced a subsidy of Rs.30,000 for promoting e-rickshaws as last mile connectivity in Delhi. This, in turn, has led to the proliferation in their demand in the city, further benefiting the market.

#### **Did you know that -**

- Ministry of Power guidelines state that there shall be at least one charging station at every 25 kms on both sides of the highway.
- There is to be at least one Charging Station for long Range/Heavy Duty EVs at every 100 kms on both sides of the highway.
- For a city, Ministry of Power guidelines are providing for at least one charging station will be set up in a grid of 3km x 3km.
- Over 2877 charging stations in 68 cities across 25 states/UTs under Phase-II of FAME India Scheme have been sanctioned.
- A budget provision of Rs. 10,000 Crore has been earmarked for 2019-20 to 2023-24 to establish charging infrastructure.
- An additional 678 public EV charging stations were set up between October 2021 and January 2022 in 9 major cities.
- By 2030, 30% private cars 70% commercial vehicles, 40% buses and 80% two-wheeler will be electric vehicles.
- About 50 Solar Based Charging Infrastructure for EVs were sanctioned and installed under FAME I scheme.
- Out of 1640 EV charging stations in India, 940 EV charging stations have been established in 9 major cities.
- About 520 Charging Stations/ Infrastructure for about Rs. 43 Crore was sanctioned under FAME I scheme.
- Oil distribution companies are to set up 22,000 EV charging stations in major cities, roads and highways.
- The two-wheeler EV market is to be valued at US \$ 2 Billion and its penetration will be 16% by 2025.

- Four-wheeler market is predicted to be valued at US \$ 1.5 Billion with a penetration of 5% by 2025.
- FAME II has been allocating US \$ 1.4 billion for 1.6 million hybrid and electric vehicles since 2019.
- By 2030, the Asia Pacific market is projected to hold the largest market share of US \$ 206 billion.
- Over 1576 EV Charging Stations across 16 Highways & 9 Expressways under FAME scheme.
- Presently, 8.7 lakh EVs have been registered across states
- India's position is the 5th largest automaker in the world

### **Two wheeler segment booms**

Increasing petrol and diesel prices, government incentives and increase in spending for setting up charging infrastructure drove demand to around 152,000 two wheeler units (FY 2020) as compared to 126,000 units sold in FY 2019. They are easier to navigate through congested roads and as far as upfront cost is concerned, they are already on par with ICE vehicles. More companies being eligible for FAME-II incentives several new models are expected soon.

In February 2021, Bounce - a bike rental startup in the country made an announcement that they are planning to launch their own electric scooter. Price is expected to be around Rs. 55,000 and an additional Rs. 1450 per month for maintenance which includes battery maintenance. In February 2021, Ampere electric announced that they would be investing Rs. 700 crore in setting up new electric two-wheeler plant in Tamil Nadu. It will have the potential to start manufacturing 100,000 units in its first year of operation.

### **Competitive Landscape**

The Indian EV market is moderately consolidated with the presence of major players in the market, owing to cheap and readily available manpower. The startups are also expanding their presence by raising funds from investors and tapping into new and unexplored cities. Companies are investing a tremendous amount in R&D and launching new models to mark their presence in the market. Established players are introducing new models to gain a competitive edge over other players. For instance,

In August 2021, Tata Motors launched the new Tigor EV which gets Tata's advanced Ziptron high-voltage architecture that uses a permanent magnet synchronous electric motor producing 75hp and 170Nm. These output figures allow for a 0 to 60kph time of 5.7 seconds. In July 2021, Audi launched 2 EVs with e-tron SUV and e-tron Sportback . The e-tron SUV is available in e-tron 50 variant that has a 71 kWh battery and two electric motors. This configuration puts out 308 bhp with 540 Nm and claims a driving range between 264 km and 379 km (WLTP) on a single charge. In February 2021, Ampere Electric, the wholly-owned electric mobility subsidiary of Greaves Cotton Ltd, announced a phased investment potential of Rs. 700 crore over 10 years to set up a world-class e-mobility manufacturing plant in Ranipet, Tamil Nadu. A Memorandum

of Understanding (MoU) to this effect was signed by the Company, with the Government of Tamil Nadu.

### **EVI 2021 - Recent Developments**

In June 2021, Tata Motor Company announced its plans to mainstream EV, and targets 50,000 annual sales in FY 2023. The company has sounded out vendors on an assured production plan of 50,000 EVs in fiscal 2023 and scale it up to 125,000-150,000 units annually in the following two years. In January 2022, MG Motor India officially announced that it would launch an electric vehicle by March 2023. It will be priced between Rs 10 lakh and Rs 15 lakh and will target masses. This all-electric crossover will be based on a global platform, which is customized for the Indian market. It will be a sub-4-meter crossover and could offer an electric range of over 300kms. It will be positioned against the best-selling Tata Nexon EV. The company aims to localize some of the components for its new electric vehicle to meet the government's guidelines of product linked incentive scheme.

In December 2021, Hyundai Motor India announced its plans to invest Rs. 4,000 crore to launch half a dozen electric vehicles by 2028 in a series of targeted product interventions, underscoring increasing consumer preference for mobility solutions of the future. The company is also in talks with six private and state-run companies in India to boost vehicle charging infrastructure and alleviate a key concern among EV buyers. In July 2021, Olectra Greentech announced that along with its sister company Evey Trans Pvt Ltd, it had won the bid for 100 electric buses. The consortium of both the companies has won the bid to supply 100 electric buses to a State Transport Corporation (STC) in the country under the Government of India's FAME-II scheme, on an OPEX model basis for 12 years. These 100 electric buses are going to be used for inter-city operations.

In April 2021, Mahindra & Mahindra announced its plans to launch 16 electric vehicles (EVs) by 2027 across SUV and light commercial vehicle categories to strengthen its leadership position in India's electric mobility segment. The company, which has set a cumulative revenue growth target of 15-20 per cent by 2025, is keeping its options open to either private investors or plans to carve EV as separate entity.

### **India's EV FAME II Incentives & PLI Schemes**

India rolled out the website e-AMRIT – <https://www.e-amrit.niti.gov.in/> – at the COP26 Summit in Glasgow, which is a one-stop destination for all information on electric vehicles. It addresses key concerns about the adoption of EVs and their purchase – such as charging facility locations and EV financing options as well as information about investment opportunities, government policies, and available subsidies for drivers and manufacturers.

The federal government is also prioritizing the shift towards clean mobility, and recent moves to amend the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles in India (FAME) II scheme to make electric two-wheelers more affordable, is a case in point. Under the

phase two of the FAME scheme, about 1,65,000 electric vehicles have been supported, as on November 25, 2021, by way of demand incentive amounting to about Rs. 5.64 billion (US \$ 75.16 million). Further, under the scheme, approvals have been granted for 6,315 electrical buses, 2,877 EV charging stations amounting to Rs. 5 billion (US \$ 66.63 million) in 68 cities across 25 states/Union Territories and 1,576 charging stations amounting to Rs. 1.08 billion (US \$ 14.39 million) across nine expressways and 16 highways.

**Production-linked incentive schemes:** Multiple production-linked incentive schemes intend to create a local manufacturing ecosystem to support goals around greater adoption of electric mobility transport. This is sought to be achieved by incentivizing fresh investments into developing indigenous supply chains for key technologies, products, and auto components. In May 2021, the government rolled out a Production-Linked Incentive Scheme (PLI) for ACC Battery Storage Manufacturing, which will incentivize the domestic production of such batteries and reduce the dependence on imports. This will support the EV industry with the requisite infrastructure and will significantly cause a reduction in cost of EVs. On September 15, 2021, the government approved a PLI Scheme for the automobile and drone industry, which intends to incentivize high value advanced automotive technology vehicles and products, including 'green automotive manufacturing'.

The PLI Scheme for the auto sector is open to existing automotive companies as well as new investors who are currently not in the automobile or auto component manufacturing business. The scheme has two components:

- i) Champion OEM Incentive Scheme: This is a 'sales value linked' scheme, applicable on battery electric vehicles, and hydrogen fuel cell vehicles of all segments.
- ii) Component Champion Incentive Scheme: This is a 'sales value linked' scheme, applicable on advanced automotive technology components of vehicles, completely knocked down (CKD)/ semi knocked down (SKD) kits, vehicle aggregates of 2-wheelers, 3-wheelers, passenger vehicles, commercial vehicles, and tractors etc.

### **Emerging EV market players & states**

Many leading battery producers like **Amara Raja Batteries**, have picked up the cue from these incentives to orient new investments into green technologies, including in lithium-ion batteries. Responding to the opportunity that India's EV industry presents, leading players like **Ola Electric Mobility Pvt, Ather Energy, and Mahindra Electrics** are rapidly growing their market presence. Moreover, certain states like **Karnataka and Tamil Nadu** are rolling out innovative and timely investor-friendly policies besides building necessary infrastructure. Recently, the American electric vehicle and clean energy company Tesla Inc. marked its entry into India by incorporating its subsidiary, **Tesla India Motors and Energy Pvt Ltd**, in Bengaluru.

In February 2021, Ather Energy, India's first intelligence EV manufacturer moved its US \$ 86.5 million factory from Bengaluru (Karnataka) to Hosur (Tamil Nadu). Ather Energy's factory is said to have an annual production capacity of 0.11 million 2 wheelers. In March 2021, Ola Electric, the subsidiary of the unicorn Indian ride-hailing start-up, also announced that it would be

setting up the world's largest electric scooter plant in Hosur at a cost of US \$ 330 million, and aiming to produce 2 million units a year. By 2022, Ola Electric wants to scale up production to pump out 10 million vehicles annually or 15 percent of the world's e-scooters. The market interest for electric 2 wheelers can be seen from the fact that Ola Electric reportedly clocked Rs. 11 billion (US \$ 149.26 million) in sales over a two-day purchase window. The electric scooters are manufactured at the Ola Future factory near Krishnagiri in Tamil Nadu.

On September 9, 2021, **Greaves Cotton** announced its entry into the multi-brand electric vehicle retail segment under the brand name AutoEVMart. According to reports, it will present consumers with a wide range of electric vehicles to choose from – from Ampere Electric to other brands in the EV space. Thus, AutoEVMart will serve as a marketplace for electric vehicles, offering e-two-wheelers and e-three-wheelers, among others, along with EV accessories. Greaves Cotton envisions first-of-its-kind multi-brand retail stores for clean tech or electric mobility in Bengaluru. Recently, **Sterling and Wilson Pvt Ltd (SWPL)**, India's leading engineering, procurement, and construction company announced its entry by signing a 50-50 joint venture with Enel X to launch and create innovative charging infrastructure.

There have also been positive developments in the expansion of charging infrastructure across the country – states like **Andhra Pradesh, Uttar Pradesh, Bihar, and Telangana are setting impressive targets** for the deployment of public charging infrastructure to increase uptake of electric vehicles. The key reasons why these states are doing better than others are local fiscal sops, better logistics, an investor-friendly government policy, business facilitation through easier access to authorities, supply chain connectivity, and the availability of suitable land. **Karnataka was the first state** to introduce a comprehensive EV policy and has emerged as a hotspot for EV businesses in India, both in EV and EV ancillary manufacturing as well as R&D segments.

**Tamil Nadu** is also leaping forward at a commendable pace, owing to its supply ecosystem, larger land parcel, proximity to ports, and proactive investor support through administrative portals like - Guidance Tamil Nadu. Despite the COVID pandemic, market sentiment has retained positivity - in FY 2020, EV sales for two-wheelers in India increased by 21 percent. For EV buses, the sales for the same period increased by 50 percent. In January 2021, 15,910 units of EVs were sold in India, and out of these, the maximum units were sold in Uttar Pradesh, followed by Bihar and Delhi.

### **Union Ministries, State EV Policies & Non-fiscal Measures**

**National Electric Mobility Mission Plan 2020 (NEMMP)** was launched in 2013 by the Department of Heavy Industry (DHI) as a roadmap for the faster manufacturing and adoption of EVs in India. As part of the NEMMP 2020, the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME I) Scheme was notified in April 2015, to promote the manufacture of electric and hybrid vehicle technology. It has mainly focused on four aspects – demand creation, technology platform, pilot projects, and charging infrastructure. For demand creation, incentives have mainly been disbursed in the form of reduced purchase prices. FAME II was



launched in 2019 for a period of three years, this scheme has an outlay of US \$ 1.36 billion to be used for upfront incentives on the purchase of EVs as well as supporting the development of charging infrastructure. It focuses on supporting electrification of public and shared transportation and on June 11, 2021, the **Ministry of Heavy Industries** announced further amendments to the FAME II scheme to give a boost to EV demand among consumers.

Under the revised policy, the subsidy per electric two-wheeler (Indian-made), which is linked to the battery size, has been increased to Rs. 15,000 (US \$ 204.60) per Kilowatt-hour (KWh) from Rs. 10,000 (US \$ 136.40) per KWh. Furthermore, electric two-wheeler manufacturers can now give discounts of up to 40 percent to consumers, which is a significant raise from the previous cap of 20 percent. Industry stakeholders are now expecting the EV two-wheeler industry to clock sales of over six million units by 2025.

**The Union Ministry of Power** has clarified that charging EVs is considered a service, which means that operating EV charging stations will not require a license. It has also issued a policy on charging infrastructure to enable faster adoption of EVs. The revised consolidated Guidelines & Standards for Charging Infrastructure for Electric Vehicles was promulgated on January 14, 2022. These guidelines include provisions for a) individual owners of EVs and b) for public charging stations (PCS) infrastructure. It covers land use and access, power tariffs, state and central government roles, timelines for providing connectivity for installation of PCS, among other concerns. The Union Ministry of Road Transport and Highways announced that both commercial as well as private battery-operated vehicles will be issued green license plates. It has also notified that all battery operated, ethanol-powered, and methanol-powered transport vehicles will be exempted from the commercial permit requirement.

**The Union Department of Science and Technology** has launched a grand challenge for developing the Indian Standards for Electric Vehicle Charging Infrastructure. **Niti Aayog's National Mission on Transformative Mobility and Battery Storage** has been approved by the cabinet, and the inter-ministerial steering committee of the Mission will be chaired by the CEO of Niti Aayog. The Mission aims to create a Phased Manufacturing Program (PMP) for five years till 2024, to support setting up large-scale, export-competitive integrated batteries and cell-manufacturing giga plants in India, as well as localizing production across the entire electric vehicle value chain. Over 27 states/UTs have formulated strategy plans for transforming mobility to provide their citizens with safe, inclusive, economic, and clean transport options.

Most recently, in September, Assam announced its Electric Vehicle Policy, 2021 and plans to phase out fuel-based vehicles by 2030. As a first step, the Assam government shall convert all government vehicles and its public bus fleet to EV alternatives. The state also aims to deploy 200,000 electric vehicles in the next five years. Assam's Industries, Commerce and Public Enterprises Department said the new EV Policy incentivizes people to switch to EVs. Assam also offers several incentives for EV manufacturing in the state under the North East Industrial Development Scheme, 2017 and the Industrial and Investment Policy of Assam, 2019.

**EESL - Energy Efficiency Services Ltd (Convergence Energy Services Ltd)** is a Super Energy Service Company (ESCO), which enables consumers, industries and governments to effectively manage their energy needs through energy efficient technologies. EESL is implementing the world's largest energy efficiency portfolio across sectors. EESL is promoted by Ministry of Power, Government of India as a Joint Venture of four reputed public- sector undertakings - NTPC Limited, Power Finance Corporation Limited, REC Limited and Powergrid Corporation of India Limited. It also handles acquisition of EVs for central and state government departments with a plan to shift to electric cars and SUVs that could generate a business of Rs. 65,000-70,000 crore in the next three years for the EV industry.

In the Budget, the government tripled the allocation for the scheme to subsidise the purchase of electric vehicles. The subsidy under the Faster Adoption and Manufacturing of Hybrid & Electric Vehicles (FAME) for fiscal 2023 is projected at Rs 2,908 crore, or more than three-and-a-half times the allocation of Rs 800 crore for this fiscal year and almost nine times higher than FY21

### **Huge Potential or Challenges & Obstacles**

**Insufficient charging infrastructure:** In 2019, there were only 650 charging stations in India as against over 0.3 million in China. Lack of sufficient charging infrastructure is one of the primary reasons why customers often refrain from purchasing EVs. India's EV ambition will also require an estimated annual battery capacity of 158 GWh by FY 2030.

**High costs:** A major concern is the current high price of EVs. As compared to lower-end (internal combustion engine) ICE cars, electric cars in the same segment tend to be more expensive. This is mainly because of the higher cost of technology used in the EVs, which constitutes a substantial portion of the cost, not leaving much scope for other features usually available in premium cars.

**Limited options:** Since it is still a budding industry, customers have a very limited range of products to choose from. Increased investment in the sector will make it more competitive in due time and this will help create further demand.

**Kms/Charge & Lower mileage:** There is immense scope for R & D. There is the range anxiety (kms/charge), as EVs in India are not cost competitive to an average customer compared to internal combustion engine (ICE) vehicles prove to be more cost effective.

**Dependency on imports:** Reliance on imports of battery as well as other components is also one of the factors adding to the cost of EVs in India. The EV market growth depends on availability of capital for investors, domestic original equipment manufacturers, Indian battery manufacturers, and local charge point operators

**Grid challenges:** The price of charging EVs at private charging stations leaves much to be desired. According to Brookings India, projections for 2030 show that even with a fair

penetration of EVs, the increase in demand for electricity is likely to be about 100 TWh (tera watt-hours) or about 4 % of the total power generation capacity. Hence, the need to increase power generation to meet growth in demand.

### **Governments Need to Act Faster & OEMs Need to Respond or India Loses Advantage**

Acquisition cost & finance, charging infrastructure, limited swappable battery options, limited battery swapping infra, CNG competition, retrofitting, lack of awareness, concept-selling, etc. are serious impediments. Reluctance to go for EVs is also due to safety, performance and service concerns. Most buyers are looking for a single-point regulator for electric scooters, implementation of Indian standards for electric scooters, batteries and any other critical assemblies. Buyers also want adherence to those standards, robust testing and approval process followed by pilot rollouts. Till this is done, many consumers believe, an electric vehicle should not be rolled out in the market.

To conclude in a sentence – There are impediments but the challenges posed are also huge opportunities that must be exploited for India to leapfrog in the global EV and efficient energy industry, besides it being an imperative to meet domestic and international commitments or obligations.

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