



# ELECTRIC VEHICLES: OPPORTUNITIES AND CHALLENGES AND RECENT DEVELOPMENTS IN INDIA

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**Abstract:** EVs have become need of the time as they can replace the fossil fuels in automobile sector. Electrification of automobile sector can help in reducing the pollution, dependence on the fossil fuels and also increased energy efficiency. It is one of the ways to achieve long term sustainability. This paper covers comprehensive study of opportunities and challenges faced by automobile sector of Indian economy and how to tackle these challenges in terms of policy development for sustainable adoption of EVs.

**Key-words:** Electric vehicles, automobile sector, Transition, E-mobility, Adoption

## Introduction:

As per the study of Climate Risk Index 2020, India already ranked in top 5 polluted countries. Therefore there is dire need to adopt e-mobility. Introduction of Electric Vehicle is the major step in towards reducing pollution. The push for electric vehicle is driven by global climate agenda with the aim of reducing carbon emissions in the environment as carbon emission plays vital role in global warming. Moreover automobile running expenses are going up due to expensive imported fuel. EVs also lower down oil import by about \$60 Billion by 2030. Transition to electric mobility is promising strategy for India in terms to cost and climate change.

The vehicles which run partially or fully on electricity are known EVs. They have low running cost and also environment friendly as they use very less or no fossil fuels. The electric vehicles have become fast growing industry in India. China is so far leading this EVs industry in the world with more than 80% of the global production. There is a reason behind it which is lithium monopoly. Lithium-ion battery packs are used in small two wheelers as well as in commercial vehicles. After Covid-19 several countries are hesitating to deal with China for the manufacturing of EVs, it is biggest opportunity for India to become manufacturing hub of this industry. Government of India has taken many initiatives to give a boost to this growing industry.

## Objectives of the study:

- Studying the impact of electric vehicles on automobile industry/stakeholders
- To study the opportunities and challenges faces by EVs industry.
- To suggest the measures for improvement in this industry
- To study the recent developments in EVs industry.

## 1 Studying the impact of electric vehicles on automobile industry/stakeholders

India transition to electric mobility has impact on value chain especially in component market and job sector.

EV forecasted that e-rickshaws, e- two wheelers, e-autos will be 4 million units by 2025 which will be promising segment.

Automakers are making continuous investment in car divisions as process of manufacturing need to be change .Also supply chain partnership need to be created.

India will be commanding leadership in EV space with a projected share of 30% of new vehicles by 2030. Government has made a proposal to install charging station at about 3KM in major cities & every 50KM on major national highway

Indian automotive sector is dominated by two-wheelers (scooters, motorbikes) and three-wheelers (autos and rickshaws) .With government emphasis and initiative taken by private player's e-mobility is possible in automobile sector. Increasing investments and product launches by major OEMs into the country and their focus on localizing supply chain facilities is creating positive outlook in the market

The level of market maturity in India varies state to state depending on so many factors such as demographics, income levels, regulatory, and urbanization. The state of Uttar Pradesh, having low urbanization rates, has seen significant uptake of electric two-wheelers. Maharashtra, with a higher urbanization rate, has the highest penetration of electric three-wheelers and passenger cars. Delhi is home to the largest consumer of electric commercial vehicle fleet due to a higher demand for electric buses and trucks.

### Impact on job sector

As India's mobility sector shifting towards electric vehicles job opportunities also arising in electric vehicle segment .According to Ministry of Skill Development and Entrepreneurship 1 crore jobs will be created in EV sector by 2030. This will increase 5 crore indirect (associated with EV) jobs in India by 2030. Currently there is very strong demand of engineers, power line installers, mechanics, professionals etc.

The EV sector already affecting the automobile component manufacturing sector as there are above 8,000 MSMEs and 50,000 in retails and distribution of aftermarket components which will be generating over 30,000 jobs.

With the emergence of electric vehicles, companies are looking for engineers and professionals with cross-sectional expertise in chemical engineering, electronics, electrical engineering and computer science engineering. Future of automobile sector is e- mobility therefore it is better to evolve with it.

There are so many institutes who already started providing certificate courses in e-mobility

- a. CADD centre with affiliation with NSDC providing certification in e-mobility
- b. IIT also offering MTECH in e-mobility.
- c. Automotive Research Association of India (ARAI) and the National Programme on Technology Enhanced Learning (NPTEL) started online courses in e mobility
- d. The Automotive Skills Development Council (ASDC) collaborated with MG Motors and Autobot India launched a Nanodegree programme in Electric Mobility

In majority EV sector creating the demand for highly skilled manpower in various field of blue, grey, white and green color jobs as there is paradigm shift in employment structure.

## 2 To study the opportunities and challenges faces by EVs industry

Manufactures are compelled to provide the EVs globally due to many factors like low/ zero emission, Govt. support in terms of subsidies and tax rebates. This has helped in growth of demand for EVs in India. Growth of 133% in the sales of EVs was observed during 2015-2020 but this no. seems insignificant when compared to sales of conventional vehicles. It was observed that in the last FY 2021-22, the total vehicles sold in India have a share of EVs just 1.32%. The penetration of EV is slow as this industry is in its infancy stage. However the market has rapid growth and has many business opportunities also. According to an independent study by CEEW Centre for Energy Finance (CEEW-CEF), By 2030, The India will be having EV market of a US\$206 billion if India is able to meet the required progress to achieve the target. We had a halt in production in last two FYs due to lockdown resulted in disrupted supply chain. But this industry has got a boost in terms of initiatives taken and policies made by government. Not only general public is keen to adopt this change but many corporate and government is also showing interest in EVs. With 100% FDP in two wheeler EV market is growing rapidly. There is month on month increase in sales and a lot of inquiries are reported in this industry. The data shows that UP is the major consumer and Assam is on 2<sup>nd</sup> place followed by Maharashtra in terms of sales of EVs. This industry is also providing many business opportunities to the economy like:

- Charging stations for EV
- Recycling business of Batteries
- Swap Technology for Batteries
- solar electric vehicle charging
- Home charging stations

- EV Equipment Manufacturing
- EV Franchise and Dealership

### Challenges:

- The society has anxiety about this range as people are worried about the battery life. They doubt about the capability of vehicle also due to absence of charging stations on the routes. The infrastructure for charging the EVs is very weak in rural and remote areas of the country.
- Due to relative new technology, people doubt about their repair and maintenance network. Lack of skilled people for the repairing and maintenance of EVs is also playing as one of the major challenges.
- High initial cost is again a Due to scarcity of raw material, Cobalt and Lithium, in India, this sector is dependent on China and Korea for the Battery which as again a limitation of this sector.
- Lack of full range of the product is also not acceptable by the general public. People want choices or different models in one particular product but due to non availability of wide choices, they are reluctant to adapt this transformation challenge for this sector.
- Charging network is getting improved still we lack in fast -charging stations in India.
- Battery, charging, driving range, and after sales are the big concerns of potential customers rolling like a hurdle which is to be removed in the way of growth of EVs.
- Long delivery time is also a hurdle which is to be handled carefully for rapid growth of Ev sector.

### 3 Suggestions for Improvement:

- Massive awareness among the potential customers is yet to be done on mission mode about the benefits of adopting this transformation. During Covid-19, the world has experienced the pollution free environment due to long stretched Lock downs throughout the world. Now most of us do understand the importance of pollution free environment. OEMs should take the edge to discount this sector.
- There should be availability of efficient charging infrastructure throughout the country. Rural and remote areas of the country must also have this infrastructure to experience the upcoming growth in this sector.
- EV is launched with new technology and as per the perception of customers India lacks the skilled human resource to repair and servicing the EVs in form of maintenance. This is to be dealt by introducing the new curriculums in the adult education in the form of diplomas and other short term certificate courses.
- Up gradation in terms of aftersales services for customers is the one of the good ways to attract more into this sector.
- Branding in terms of repositioning can give a dose of life to this sector.
- Collaborate with municipality and local infrastructure providers for the fast-charging stations.
- Integrating online and offline retail showrooms to reduce the cost. This sector is enjoying less profit as compared to Traditional automobile sector due to heavy charging infrastructure cost, high cost of production and lower after sales revenues.
- Govt. of India can come up with new policies to encourage this transformation like free parking, waiving permits for E-auto rickshaws, and No road tax etc.
- There should be special Incubation centre for EVs.

### 4 To study the recent developments in EVs industry.

According to survey conducted by KPMG on auto executives, there will be sale of 39 percent electric vehicle by 2030. With the Government initiatives EV industry in India is gaining momentum with 100%. New manufacturing hubs and push to improve charging infrastructure is picking pace. Indian Electric Vehicle Market is going to achieve target of US\$145.34 billion by 2027, at a CAGR of 90.65% during the forecast period.

Indian Automobile Industry is 5<sup>th</sup> largest in world aiming to be 3<sup>rd</sup> largest in 2030. Below is the list of Original Equipment Manufacturer (OEM) in India

Passenger Vehicles	2 Wheelers	3 wheelers	Commercial Vehicles	Tractors
<b>Number of OEMs</b>				
15	13	7	12	17
<b>No. of Manufacturing units</b>				
29	22	7	34	20
Maruti Suzuki	Hero Moto Corp	TVS	Tata Motors	Mahindra
Hyundai		Bajaj	Ashok	Escorts
Tata Motors	Honda Motors	Piaggio	Leyland	TAFE
Fiat	Bajaj	Atul Auto	Force Motors	John Deere
Ford	TVS	Scooters India	Hindustan Motors	New Holland Tractors
Honda	Suzuki	Mahindra	Isuzu Motors	International Tractors
General Motors	Motorcycles	Force Motors	Mahindra	Force Motors
Mahindra	Yamaha		AMW Motors	Indofarm Tractors
Nissan	Mahindra		Piaggio	SAS Motors
Toyota	Royal-Enfield		Vehicles	HMT Tractors
Volkswagen Group	Piaggio		SML Isuzu Ltd	CNH Industrial
Renault	LML		Eicher	ACE
Premier Auto	Harley		Volvo	Preet Tractors
Mercedes Benz	Davidson		Man Force	SAME DEUTZ – FAHR INDIA
BMW	Triumph			Standard Tractors
	Kawasaki			Captain Tractors
				Trishul Tractors

India's committed towards reducing pollution and carbon footprint. The country desires the car manufacturers to migrate to EV production, which will curtail the import of oil and shrinks the bill by US\$60 billion, cut emissions by 37 percent .Our dependence on the imports of fuel decreases which will be act as a shield from vulnerability against crude prices and currency fluctuations

## Government is taking steps for Promoting Manufacturing of Electric Vehicles

The Indian Government has already started EV adoption policy, National Electric Mobility Mission Plan (NEMMP), Faster Adoption and Manufacturing of (Hybrid) and Electric Vehicles (FAME) Scheme, loan subventions, and income tax rebates are schemes which facilitate in turning automobile sector into e-mobility.

1. GST on the electric vehicles and on charging stations has been reduced from 12% to 5% and from 18% to 5%, respectively.
2. The Ministry of Power issued notification regarding charging infrastructure standards permitting private charging at residences and offices.
3. Green license plates provided to battery operated buses and it will be exempted from permit requirements, as announced by the Ministry of Road Transport & Highways
4. Road tax on EVs has been waived as per notification issued by MoRTH
5. Customs duty relaxation on importing EV parts.
- 6 . Five-year phased manufacturing program (PMP) until 2024
- 7 Reducing GST amount to 5% from regular cars' 28% under **Switch Delhi Campaign**

### Launch of 'e-AMRIT' portal: One-stop platform for information on electric vehicles

India launched e-AMRIT website which is one stop destination for all the information such as charging locations, investment, govt. policies, subsidies and business opportunities.

Government is taking 360 degree initiatives to install charging stations for public with collaboration with private and public agencies (BEE, EESL, PGCIL, NTPC, etc.). Private organizations are also shoeing interest to install charging service stations for ev which will boost up the confidence of consumers in EV



- The Department of Heavy Industry has sanctioned 1576 Public Charging Stations on 25 Highways & earth Expressways.
- The Maharashtra Government started campaign for increasing EV use in the state. It exempted EV's from road tax and providing a 15% subsidy to the first lakh EV's registered in the state.
- Uttarakhand Government also introduced a new scheme under which companies are granted loan between 10 crores to 50 crores for install electric vehicle and charging stations
- Delhi is offering maximum subsidies on EVs. And it is followed by Maharashtra and Meghalaya
- Even last mile delivery companies started using EVs for transporting deliveries which definitely reduce the carbon footprint from the.

As EV market is accelerating at faster pace in India, car and bike manufacturers automatically inclining towards manufacture of electric run vehicles

### Electric Vehicles in India

Famous Korean company Hyundai, launching Kona EV in India, It has supposed to run 452 km in one charge

- TATA Nexon, Tigour along with new Ziptron EVs, cars looking forward to hit roads of India.
- The Mercedes-Benz EQC, India's first high-end electric vehicle, costs 99.30 lakh rupees also launching this year.

There is another luxury series from Thee-Tron, a German luxury electric vehicle, has been released in India.

India has the world's second biggest bus market after China maximum of them are running by diesels. More than 5000 electric busses was introduced on India roads in the year 2021 out of which Delhi alone have 2000 fleet of electric vehicles

- The government think-tank "Niti Ayog" made a model concession agreement for public private partnership (PPP) which aimed to launch EVs (buses) operation and their maintenance across various cities in India
- In FAME-2 scheme incentive of 5.5 Million INR( ~\$800,000) for long electric buses, 4.5 Million INR( ~\$650,000) for midi buses and 3.5 Million INR( ~\$500,000) for minibuses are given .
- The FAME-2 scheme allocated 3,545 crore INR (\$500 million) to union territories to adopt 7000 electric buses.
- Ashok Leyland launched new range of electric buses with the name ABB's flash-charge TOSA technology. Through this technology the battery can be recharged in minutes .
- The NTPC has launched the hydrogen fuel cell based electric vehicles project

Following are companies which manufacturing E busses in India

- Tata Motors
- JBM Group
- Olectra Greentech
- Eicher
- Ashok Leyland
- Foton-PMI
- Force Motors

In two wheelers, demand for E-bikes and E scooters is also raising .Govt. charging only 5% GST on two wheelers to promote e mobility.

Hero Electric AE 29,AE 47,AE -3,AVS Cereon ,Suzuki Electric bike, Honda Active ,Bajaj Chetak are the options available in the market for e bikes and e scooters .

All above-mentioned instances and developments, government initiatives promote the demand of EVs in coming future.

### Conclusion

Adoption of EV is still long way to go as there is massive change in terms of technology and change of battery is costlier venture. Indian Government has to concentrate more on addressing the advantages of use of EVs .More tax exemptions should be given to manufacturers, installers and domestic users. Scope of EV is depending upon availability of capital, equipment manufacturers, battery manufacturers and charge point operators and acceptance of diversified customers. Innovation of clean energy created new economy and step towards green environment. Hybrid and EVs can help in achieving the sustainable development as it reduces the dependence on fossil fuels, reduces pollution by no or less emissions. India is ready for this transformation and has taken very useful and encouraging steps for its adoption. Yet, a lot to do in this direction like Govt. policies need to have more inclusiveness of demand and supply chains both, reducing the price of EVs and most importantly providing charging infrastructure in public and private domain. To support the growth of EVs in India, states should focus on creating awareness among people.

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