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IEG INDUSTRY INSIGHTS

Trends in EV Mobility

India 2019

CONTENT

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The world is seeing a dramatic transformation in the mobility industry owing to new business models, significant drops in technology costs and increased network strengths.

THE INDUSTRY IS ON THE VERGE of a massive technological disruption due to the outcomes of trends arising from the need of stricter emission regulations boosted by lower battery costs, more widely available fast charging infrastructure, increasing consumer acceptance and decreasing total cost of ownership. Global projections for EVs (Electric Vehicles) show rapid deployment with EV sales already growing in many nations.

By 2020, EVs are likely to cost the same as conventional fuel powered equivalents creating new opportunities for automobile manufacturers, for charging infrastructure companies and for battery manufacturers.

AT A POPULATION OF 1.25 BILLION people, the total Indian passenger traffic is growing at about 15 percent to reach 168,875 bpkm in 2031 – 32. The road traffic itself is projected to grow at about 15.4 per cent. Cities have increasingly witnessed the usage of private vehicles because of inadequate public transport systems. Since 1991, the total number of registered motor vehicles has gone up from 21 million to 210 million, a more than ten fold increase. Two wheeler private transport has gone up from 14 million to 154 million, a rise of more than 11 times. India is the world's biggest market for scooters and motorcycles with annual domestic sales exceeding 19 million in 2018, six times that of car sales over the same period.

THESE STATS EXPLICITLY INDICATE the need to increase the existing infrastructure for transport in the country. The Indian government has set for itself an ambitious target of 100% electric vehicles by 2030. Since then, India has seen signs of a change in private and public outlook towards electrification.

MOBILITY KEY TRENDS

RIDE SHARING Data-enabled mobility services to allow travelers to hail private, point-to-point rides. Has presence in cities with populations >2 mn because avg trip is > 5 km. TNCs could capture as much as 16% of India's vehicle-kilometers traveled by 2018.

PEER-TO-PEER VEHICLE SHARING Enables customers to rent vehicles from their neighbors or peers. The model of sharing substantially increases privately owned vehicles' asset utilization rates.

FIXED-ROUTE COMMUTER SERVICES Target commuters, who represent a large portion of total weekday trips. Commuter services are a significant opportunity for isplacement of conventional transport means.

POOLED RIDE-HAILING SERVICES Creates a marketplace for "seat-kilometers," with vehicles carrying multiple passengers. Permitting TNCs' driver-owned fleets to operate with stage-carriage permits – rapidly grows the market.

VEHICLE SHARING Allows customers to access the vehicles that they want when they need them. Vehicle-sharing networks can provide transport 4 to 10 times cheaper than driving a privately owned vehicle. Allows an access to vehicles without perpetuating the costly ownership.

INDIA'S TRANSITION to a shared, electric, and connected mobility system can save up to USD 330 BN by 2030 on avoided oil imports alone presenting a growing market for shared Electric Vehicles in the country.

ELECTRIFICATION OF THE INDIAN TRANSPORT would reduce congestion on roads, cost of transportation & transportation use. Superior economics of high mileage EVs, will enhance job creation and improve access to India's critical public transit network. EVs bring to India a wide range of opportunities, but also come with massive operational challenges including manufacturing of batteries & poor EV infrastructure.

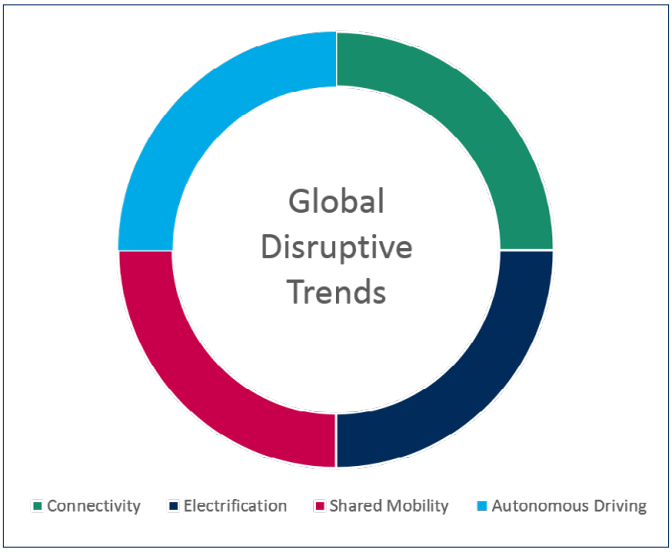
TRENDS IN THE AUTOMOTIVE INDUSTRY

ELECTRIFICATION: By 2030, EVs could account for 40 – 50% of new global vehicle sales with highest adoption rates in developed, dense cities. Smaller cities with less charging infrastructure will witness less penetration. With continuous improvements in technology, however, such differences are likely to minimize.

SHARED MOBILITY: Shared mobility like car-sharing, bike-sharing & ride-sharing offer easy, on-demand availability, vehicle flexibility and freedom from parking hassles while also cutting down ownership costs.

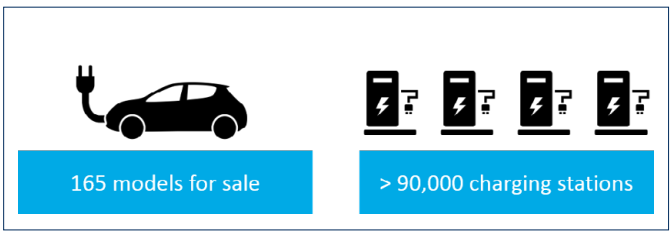
CONNECTIVITY: Automotive connectivity comprises of four relevant functional groups – in-car content and services, vehicle relationship management, insurance and driving assistance.

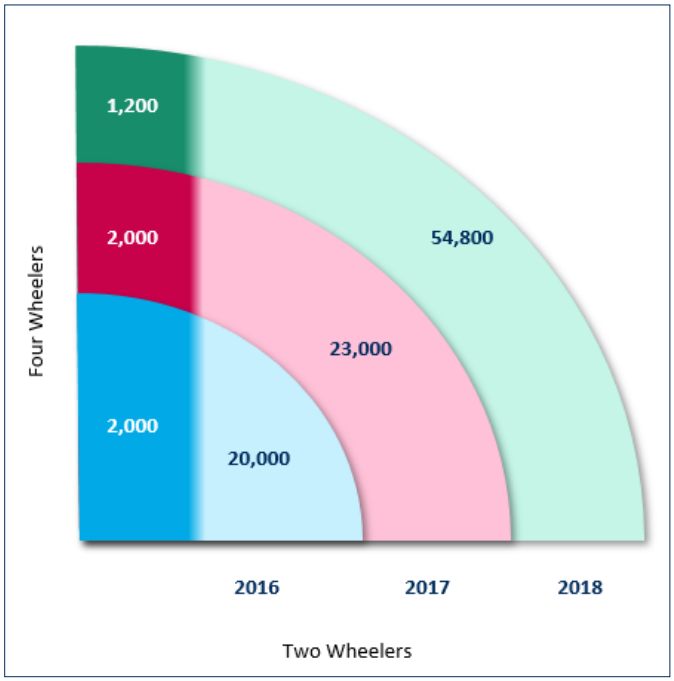
AUTONOMOUS DRIVING: OEMs (Original Equipment Manufacturers) across the world are pursuing autonomous driving vehicles by adding incremental autonomous functions. In India, however, the government is currently cautious of self- or autonomous-driving cars due to concerns that these may hurt employment opportunities. A change in the government's position in the future may shift the relevance of this global trend for India.



Source: McKinsey Report

TRANSFORMATION OF AUTOMOTIVE INDUSTRY in India is likely to be heavily driven by electrification and shared mobility, followed by connectivity and autonomous driving.

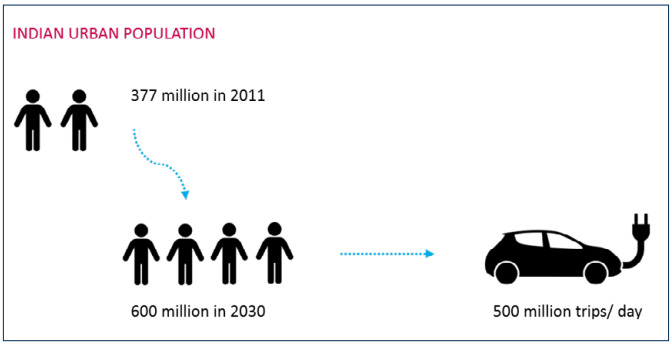




Source: FICCI report

A MAJORITY of the Indian EV purchases have been restricted to the two wheeler market accounting for over 90% of the total sales. Cars have traditionally taken up a significantly smaller share of the total units sold.

THE INDIAN URBAN POPULATION is expected to grow to 600 million people making an average of 500 trips/day by the year 2030.



Source: Driverspark.com

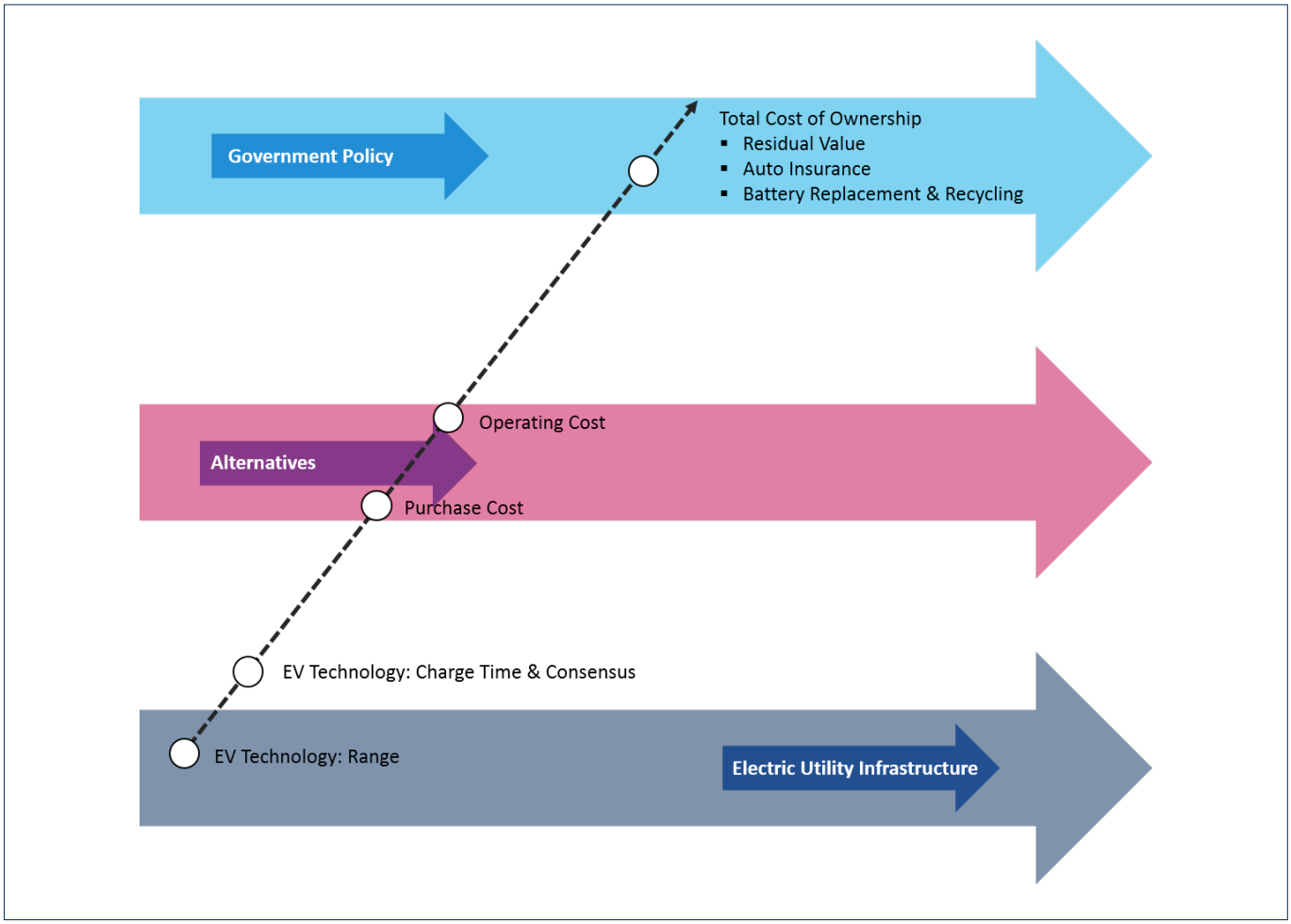
EV FOUR WHEELERS

THE INDIAN MOBILITY MARKET is separated in three categories – two wheelers (bikes, motorcycles etc), three wheelers (E-rickshaws, autos etc) & four wheelers (cars, buses etc).

THE EV FOUR WHEELERS in India account for 3 – 4% of the total EV sales in the country. The National Electric Mobility Mission Plan's, FAME scheme offers a subsidy on the retail price of passenger cars. These subsidies range from USD 160 – 340 for mild hybrids, from USD 840 – 1000 for strong hybrids; and from USD 860 – 1,900 for electric vehicles. The Central Government of India and some state governments, such as the Government of National Capital Territory of Delhi (NCT of Delhi), provide tax incentives that treat hybrid and electric vehicles preferentially over conventional technologies. Growth in the market will have a key focus on exploring new markets, expanding product portfolios, and introducing new business models. Car manufacturers & suppliers will need to adopt a common standard for EV charging, leverage incentives and subsidies and deepen collaboration to promote technology development and economies of scale. Surveys show that 87% Indians will be willing to shift to electric vehicles if it reduces pollution.

EV TWO WHEELERS

ELECTRIC TWO-WHEELERS and three-wheelers look much promising for the next 10 years. After 2030, EV sales are expected in India to accelerate with increased affordability, as well as the government's efforts to ensure universal access to electricity which will lower challenges with charging infrastructure. The 2-wheeler space will be largely private ownership and subsidy driven, and will be characterized by a migration from Lead Acid to Lithium-ion batteries and from low speed to high speed vehicles. The Indian EV market has been dominated by 2-wheelers, accounting for more than 90 percent of the total EVs in India today. Electric two-wheelers are much more viable as far as charging in houses are concerned compared to cars as the batteries are lighter and can be carried into the house.

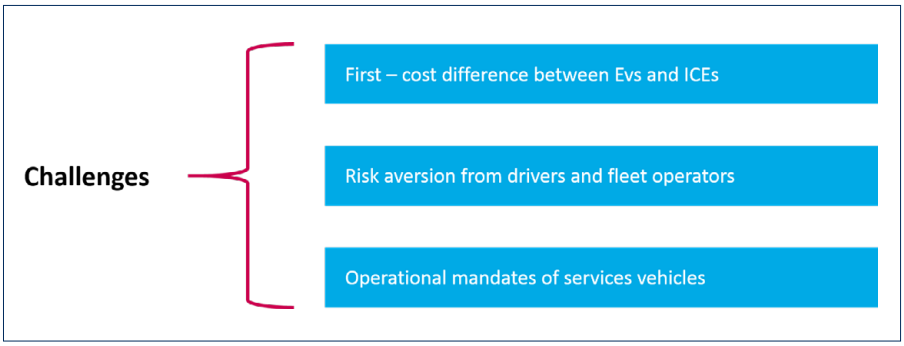


Source: IEG – India

AN INCREASE in total cost of ownership, fall in operating costs for EVs combined with proactive government policy to support EV sales, will drive the growth in to the future for EVs in India.

CHALLENGES

A WIDE PUBLIC CHARGING INFRASTRUCTURE must be made available in order to achieve the 2030 100% in EV sales. Usage of regular electric vehicles would require EV charging infrastructure, to power EVs and to provide valuable grid services, reducing customers' concerns around range anxiety and enhancing India's rapidly changing electric grid. Deployment of scaled EV charging infrastructure would be a challenge given India's size, complex policy & regulatory environment, and weak electricity distribution infrastructure. Adoption of battery swapping may be necessary to complement the EV infrastructure and also reduce the upfront cost of EVs. Another block stone is the scarce availability of lithium reserves in India for manufacturing lithium-ion batteries. Battery manufacturing, to reduce the cost of batteries – currently the most expensive EV component – and to make them in India, is essential to accelerate EV adoption, and to reduce a shift to importing these batteries (an eventual replacement of expensive oil/gas imports).



Source: IEG – India

WAY FORWARD

INDIA'S MOBILITY and electricity sectors can create more value together. India's vision of leapfrogging the traditional passenger mobility system to one that is shared, electric, and connected has many implications for India's electricity sector.

WHILE THERE HAS BEEN considerable progress, a major barrier quintessential for a successful EV system remains: lack of electric vehicle infrastructure. While this presents a major hindrance to the shift to electric shared mobility, it also presents a massive opportunity for India's transport and electric systems. A study estimates that EV owners' total expenditure on EV charging could be nearly USD 11 billion per year by 2030. This additional requirement represents a significant financial opportunity for India's distribution companies (DISCOMs).

THERE IS TREMENDOUS POTENTIAL for India to manufacture the kind of hardware needed to host an EV system required to support its population. However, a systematic deployment of EV infrastructure for scooters and three-wheelers should precede, through a combination of conventional charging and battery swapping infrastructure, and the provision of four wheelers, private four wheelers and buses should follow it.

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