CHALLENGES WITH ELECTRIFICATION

People around the globe are facing and battling the worst pandemic crisis, along with the global economy facing massive downtime.

Countries around the globe have posed stringent restrictions ranging from days to months of lockdown periods. Many businesses stalled, waiting for the market conditions to improve and some have already sunk under the unforeseen brunt of the pandemic.

But, there are still several segments of industry that are outshining and even looking at this period as an opportunity. The EV industry is touted to be one of those and promises even better growth, post this period. In the last few months, the entire public transportation in many countries was halted due to increased risk of infection, given the contagious nature of COVID-19. Since the unlocking of lockdown periods, many people are avoiding using these public or shared media of transportation, including cabs, metro, and buses, as a precautionary measure. There is visible evidence confirming that private transportation, walking, and cycling have gained the most since the pandemic began, while bus ridership has declined. With the current state of online education, remote work, and more shift to virtual events, the pandemic has changed the way we live, learn, and experience, indicating a “New Normal”. Overall, the need for long commutes has reduced. According to a recent study, 65 percent of the journeys by Indian households are of distances up to 10 km. This could lead to a shift towards micro or personal mobility in terms of e-bikes, electric 2-wheelers, or quadricycles.

This is where a systemic shift towards e-mobility for several urban mobility service providers for areas like last-mile connectivity through Yulu or Bounce and the cab-aggregators like Lithium, Ola & Uber or the e-commerce aggregators like Flipkart & Amazon with their delivery fleets is causing a radical transformation in the micro, shared and fleet mobility segments. Besides, there is also a shift in terms of the transportation in the rural areas shifting towards lead-acid based retro-fitted electric 3-wheelers or local municipalities adopting electric 3-wheelers or trucks cleaning or garbage pick-up.

Given this future situation, it portrays a promising picture for the EV industry, especially for the daily city commuters who travel shorter distances within the city such as people from service industries, homemakers, students, etc. Being safer and more economical mode
of transportation, the segment will most likely gain momentum in the coming days with a major surge in demand.

**EVs set to emerge stronger than ever**

In the current scenario, the Indian EV market will continue to be largely driven by the 2-wheeler and 3-wheeler segments as of now. As per a recent EV market forecast by Frost and Sullivan, e-rickshaws, e-autos, and e-two wheelers are the most promising segments for electrification in India and are expected to account for over four-million units by 2025.

The, post COVID-19 period will serve as a perfect chance for EV brands to connect with their customers from these segments. A lot of top brands are using this time to get in touch with customers through digital mediums to improve loyalty and sustain brand awareness. Since e-commerce is on the rise, EV brands may also use this downtime to create a stronger online presence for more visibility. By making the most out of these opportunities, EV companies will be able to recuperate their impetus and investment once the contagion is confined. They will be back in action on the road to the EV uprising in the country.

The Govt. Of India, along with the think-tank Niti Aayog, has laid out a road map which envisages the share of EVs in total vehicles sold in the country after 2030 to be 30%.

The government is also actively pursuing the policy push towards Green energy, EVs and self-reliance through the various major programmes/plans like:

**Faster Adoption and Manufacturing of (hybrid & Electric Vehicles) (FAME) & National Electric Mobility

<table>
<thead>
<tr>
<th>Status of Electric Vehicles Market in India vs-a-vis the World</th>
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<tbody>
<tr>
<td>Electric Vehicle</td>
</tr>
<tr>
<td>Bicycle</td>
</tr>
<tr>
<td>Scooter</td>
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<tr>
<td>Motor cycles</td>
</tr>
<tr>
<td>Three wheelers (including e-rickshaws)</td>
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<tr>
<td>Cars</td>
</tr>
<tr>
<td>Buses</td>
</tr>
</tbody>
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**Mission Plan (NEMMP) 2020, Low Carbon Transport scheme and Green Urban Transport Scheme** - These policies providing HEVs and EVs is expected to ensure the much-needed shift from fossil fuels to clean energy and thus ensuring isolation from the volatility of oil pricing and ecological security.

**Voluntary Vehicle Fleet Modernization Programme (V-VFMP):** The policy on end-of-life vehicles is keenly awaited by the industry as well as the public who are expecting attractive incentives for replacing their old vehicles and the industry may get a business opportunity.

**Make in India & Atmanirbhar Bharat Abhiyan:** These policies, encouraging the motto of self-reliance, are supposed to accelerate the development of indigenous technology and R & D capabilities so that the whole range of hybrid and electric components can be conceived, developed, manufactured in India.

Recently, the Government of National Capital Territory of Delhi approved the Delhi Electric Vehicles Policy  to kick-start the adoption of Electric Vehicle in Delhi.

The policy is proposed to be implemented through the following verticals:

a) Financial Incentives.
focused shift towards electrification while addressing the challenges that are stated below.

**What are the major challenges for the EV Market in India:**

**Charging Infrastructure**

As per recent reports, India was reported to have around 500 plus charging stations in 2018, while more are being approved by the government of India. Countries like China have over 600K charging points as of now. The latest announcement from the Department of Heavy Industries (DHI) mentioned that it had approved 2,636 EV charging stations in 62 cities across 24 states and UTs, under the FAME-II India program.

In a grid of 3-by-3 kilometer (km), at least one public charging station will be set up in urban areas. For the highways, at least one fast-charging station is planned for every 100 km as per the Power ministry.

The challenge doesn’t end here, we also have a major deficiency of private parking places which is another major deterrent for electric vehicles’ acceptance.

**Pricing points & Total Cost of ownership**

Average costs of electric cars in India is around ₹ 12-15 Lakh, which is way higher than the regular mid-segment car in the range of ₹ 4-7 Lakh, running on diesel and petrol. The price range of electric scooters and motorcycles in India is between the price range of ₹ 60K – 1.5 Lakh, as compared to ₹ 40K – 50K cost range of motorbikes and even lower for scooters. Under existing settings, it is going to be hard to make a decent price proposition immediately, unless the cost comes down substantially. Due to the less complexity (fewer moving

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**ELECTRIC VEHICLE SALES IN INDIA**

<table>
<thead>
<tr>
<th>Segment Of Electric Vehicle</th>
<th>FY 2018-19</th>
<th>FY 2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Wheelers</td>
<td>1,26,000</td>
<td>54,800</td>
</tr>
<tr>
<td>Three Wheelers</td>
<td>6,30,000</td>
<td>5,20,000</td>
</tr>
<tr>
<td>Four Wheelers</td>
<td>3,600</td>
<td>1,200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,59,600</strong></td>
<td><strong>5,76,000</strong></td>
</tr>
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b) Waiver of road tax and registration fees.

c) Establishment of a wide network of charging stations and swappable battery stations, and development of a publicly owned database of the same.

d) Constitution a of State Electric Vehicle Board with the establishment of a dedicated EV cell, and developing an intensive public outreach programme focused on creating awareness about the benefits of electric vehicles and key elements of the policy.

e) Setting up of Skill Centers with provision for training related to jobs in the EV ecosystem and creation of jobs) Setting up of Recycling Ecosystem for Batteries.

g) Creation of an umbrella, non-lapsable ‘State EV Fund’.

The pandemic provides an opportunity to utilise this disruption in the market, the societal mindset, and the overall landscape for a
Niti Aayog has set an ambitious goal of building up to 10 large factories to produce lithium-ion batteries over the next 10 years.

parts) of the powertrain which means lesser maintenance costs could, in turn, result in the lower total cost of ownership but the cost of the battery and its subsequent replacement within the lifetime of a vehicle needs to be addressed.

This is where innovative solutions like battery leasing or battery swapping programs along with a global reduction in battery costs need to be pursued proactively.

Risk of hikes in electricity demand

There is a major risk that EV charging can lead to a severe hike in electricity demand which will eventually put India’s already burdened electricity distribution networks at risk. Another issue is associated with charging methodology, to choose between AC (alternating current) or DC (direct current) chargers. Generally, an AC charger takes around six hours, whereas DC chargers are super-fast and take only around 40-50 minutes or one hour to completely charge a vehicle.

Considering these fluctuations in demand, there is a need for the transition of the power grid into a SmartGrid, which requires a great deal of intelligence, two-way communication, automation, distributed local controls, self-configuring and self-healing capabilities to be built in the grid.

Hence, a transition of the national grid to non-peak or distributed billing systems for such charging systems could encourage the active adaptation of EVs.

Lithium dependency

As of now, India does not have considerable Lithium reserves for manufacturing the required quantity of Lithium-ion batteries. This could lead to a substantial variation in the nation’s energy security primacies, with securing lithium stores, a key raw material for EV batteries, similar to the current dependency on overseas oil and gas trade or investments.

Researchers at the Atomic Minerals Directorate, a unit of India’s Atomic Energy Commission, have estimated lithium reserves of 14,100 tonnes in a small patch of land surveyed in the southern Karnataka district of Mandya, according to a paper to be published in the forthcoming issue of journal Current Science. “The present data provide a total estimation of available Li2O as about 30,300 tonnes over an area of 0.5 km x 5 km, which works out to about 14,100 tonnes of lithium metal,” said N Munichandraiah, emeritus professor at the Indian Institute of Science and an expert on battery technologies. But, to put this in perspective, this lithium find is small compared to the reserves with the major producers to the tune of 8.6 million tonnes in Chile, 2.8 million tonnes in Australia, 1.7 million tonnes...
in Argentina or 60,000 tonnes in Portugal, 14,100 Tonnes in India.

So far, in the absence of local mines for Lithium, India has set up Khanij Bidesh India Ltd to source and acquire mines in Argentina, Bolivia, and Chile.

Niti Aayog has set an ambitious goal of building up to 10 large factories to produce lithium-ion batteries over the next 10 years.

Hence, securing reliable, economical supplies of Lithium or researching and adapting to alternate battery technologies such as Aluminum-Air batteries, Zinc-Air batteries, Graphene, carbon-tubes electrodes or solid-state ones should be explored.

**Initiatives akin to**

a) The recent Delhi EV policy 2020, which encourages the reuse of EV batteries that have reached the end of their life.

b) Setting up of recycling businesses in collaboration with battery and EV manufacturers that focus on ‘urban mining’ of rare materials within the battery for re-use by battery manufacturers is a welcome step in the right direction.

**Future of EVs in India**

The Indian EV industry confronts openly, that a lot needs to be done to achieve the ambitious 2030 target. For a country like India, considering the huge demographics and the population, there is a huge potential in terms of the growth opportunities within this market.

The current disruption could serve as an excellent opportunity, specially to our domestic manufacturers & suppliers for further scaling up the EV related R & D in topics like charging infrastructure, new-age materials for batteries or in encouraging efficient Giga-factories to create India specific products, while building for the world. It’s also time to leverage on the special privileges provided in the new electrification policies & the self-reliance programs introduced by the government in shaping India’s EV paradigm on a fasttrack basis.

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**References:**

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