India's EV Policy

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Governments across the globe are promoting electric vehicles (EVs) primarily due to the inherent benefits such as improvement of local air quality, reduction in fuel requirement, and enhanced energy security. China has emerged as the largest EV market accounting for 99% of the global e-bus market. Norway is the worldwide leader in terms of penetration of electric cars with 70% market penetration by March 2019. Aware of the benefits, the Government of India (GOI) is proactively working towards large scale deployment of cleaner mobility solutions in the country and aims to achieve 30% penetration in private EV ownership. The country is home to some of the most polluted cities in the world (14 in top 20) and is the third-largest contributor of carbon emissions. Hence, it stands to gain a lot by developing its EV market and fast-tracking its adoption. On the economic front, EVs adoption will help the country to save U.S.$330 billion in its oil bill and reduce 1 Gigaton of carbon-dioxide emissions in the periiod 2020 to 2030.

Considering the advantages and benefits of EV, GOI has announced a series of policy measures to promote its adoption. In 2013 it launched its first policy "National Electric Mobility Mission Plan" with an ambitious target to achieve 6-7 million sales of electric and hybrid vehicles by 2020. It also helped in reducing oil dependency and achieve national fuel security. In 2015, GOI rolled out "Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles" (FAME) framework with a budget outlay of $120 million. The policy aimed to fast track the development of EVs infrastructure and promote private sector participation. Phase II of the FAME scheme was launched in 2019 with a budget outlay of $1.3 billion for three years. Besides, the government has laid out various incentive schemes and subsidies to promote EVs growth. These measures include steps like:

1. Relaxation of customs duties on EVs and related components,
2. Income tax rebate of up to INR 1.5 lakh on interest paid on loans to buy EVs.
3. Reduction of Goods and Services Tax (GST) on EVs to 5% from 12%.
4. Declaring setting up charging station as a de-licensed activity.

However, India's EV dream faces multiple roadblocks like lack of infrastructure and ambiguous policy framework leading to unwanted burning of taxpayer money. Learning from its past mistakes, the government is focusing on accurate demand prediction and development of efficient new-generation power infrastructure as the EV mission is rolled out. We discuss a few roadblocks and challenges faced by the country.

Roadblocks and challenges:

India's automotive sector is the 6th largest and the fastest growing industry in the world. Hence the transition from internal combustion (IC) engines to EVs is a mammoth task for the country. The EV demand is estimated to be 80 million leading to 28 GW of energy consumption. It's inefficient energy sector, dominated by public companies (75% market share) and a massive debt on DISCOMS ($20 billion) is a major setback for India's EV dream. Rapidly Increasing and inconsistent demand is bound to bring with itself problems of higher waiting time for charging and fluctuating power load. These problems are expected to be more aggravated than the European market due to the bigger market size. Hence, an EV policy for the country must be tailor-made to meet its particular needs and overcome unique challenges.

To understand how the country's market is different from European and the U.S. context, we will have to analyse its auto-segments. The estimated ratio of segments are:

79% Two-wheelers
4% Three-wheelers (passenger and goods)
3% Buses and large goods vehicles
12% Economy four-wheelers (< 1 million rupee)
2% Premium four-wheelers (> 1 million rupee)

India's love for the two-wheeler and economic four-wheeler is evident and is explained by the income structure of the country. To bring any substantial change in EVs use, the focus should be to overcome the challenges of these two segment. Recognising the high penetration of two-wheelers, the GOI shifted its attention to develop its EV market centred around these segments. Under its "FAME II" policy, it announced a series of incentives for manufacturing and reduced import duties on its equipment. Its policy think-tank, NITI Aayog, proposed production of only electric three-wheelers after March 31, 2023, and two-wheelers after March 31, 2025. Hence, the market division of Indian offers a lucrative opportunity for the two-wheelers segment manufacturer.

The economic four-wheeler segment also presents the opportunity to promote EVs. Comparing car ownership figures, India is far behind, with only 22 cars (per thousand) as compared to New Zealand's 774, Australia's 740 and Japan's 591. Moreover, the market of shared mobility has seen an explosion with players such as Uber and Ola. Hence, the low car ownership and an increasing fleet size of riding companies are

bound to propel the demand of four-wheelers. Sensing the favourable circumstances, GOI has also come up with incentive schemes, including a reduced GST rate, tax-free registration and support for research and development (R&D) of new technologies. The low operating cost of EVs and subsidies from the government is pushing ride-sharing companies to partner with OEMs to replace their fleet. In 2017, Ola, partnered with Mahindra & Mahindra to develop an electric mass mobility ecosystem in Nagpur, Maharashtra. The company also agreed to pool in over 100 Mahindra's e20 plus vehicles. Uber India, one of the largest ride sharing company also joined hands with Mahindra & Mahindra to set out 100 electric cars, in Hyderabad and Delhi. The growing usage of electric vehicles in shared mobility services and potential growth in car ownership creates an opportunity for four-wheeler manufactures.

Turning challenges into opportunities

India recorded over 18.5 million two and three-wheeler sales, making it the largest market in the world. Battery-powered scooters and motorcycles are spearheading the e-revolution in India. These small vehicles require a particular set of technological and industrial capabilities. It calls for the development of infrastructure exclusive to these demands and requires automakers to adopted themselves to meet the challenges. We discuss some of these difficulties and steps that manufactures have taken to meet the requirements.

a. Erratic power supply: The electricity distribution system in India is still outdated with irregular power supply in smaller towns and cities. The high cost of electrification and inefficiency of DISCOMs limit the regular supply of electricity. However, the government is focused on providing electricity to the remotest cities in India, driving on renewable energy sources. These cities are the market with high two wheeler demand. To overcome the challenge of erratic power supply automakers have come up with the idea of removable batteries. They provide an option to remove the discharged battery, place it for charging in-home and replace it with a charged spare battery. The demand for e-scooters has seen an uptick in tier 2 and 3 cities since the introduction of the concept. It also provides a local business opportunity to provide charging services. These models are expected to be a game-changer for the Indian EV market
2. Lack of engine power: The second challenge stems from comparison of engine power of IC and EV scooters. Customers find that available electric scooters on the market are useful for daily use but are not as powerful as petrol engines, which can go faster and climb slopes easily. To overcome the limitation, automakers propose the use of the lithium-ion battery. However, this increases the cost of vehicles, making it more costly by nearly two times as compared to lead acid batteries. The manufacturers therefore continue to produce lead based electric two wheelers, catering to the demand of price sensitive customers and driving the segment growth. With the availability of subsidies and increasing capabilities of lithium-ion battery automakers are focused on reducing its cost with significant R&D expenditure and making them in-house.
3. Supply chain problem: The supply chain for e-vehicle components is still in the nascent stage and is not robust. Manufacturers need to rely on importing components, which increases their manufacturing cost. Moreover, the lack of service centres and a skilled workforce hurts customer experience. Hence, manufacturers demand support of government and subsidies to develop a robust and efficient supply chain. Government's help in such cases will not only increase the demand for two-wheelers but also increase customer awareness of EVs.

The private automakers have played their part by improving vehicle efficiency, power and developing its supply chain. This has led to invaluable learning for the manufactures and development of their technology. They find a high place in the learning curve as compared to other European or U.S. market competitors. The experience gained creates an opportunity for these companies to take a leadership role in the world for the two and three-wheeler segment. The statement by NITI chief Amitabh Kant echoes the same "We were late in making India a hub for mobiles, ICE four-wheelers, but we have to make sure the country becomes the manufacturing hub for the two-wheeler and three-wheeler".

Business model for increasing EV penetration:

We now discuss a few possible business models that can be used based on market maturity. In India, the initiative to push and promote a shift towards EVs has mainly been taken by the government. The infrastructure and charging station (CS) facilities are majority government-owned with few private partnership. The single ownership, lack of expertise and diverse need of the market pose a significant challenge to the government. Sharing risk and responsibilities with private enterprise and state governments will help GOI build a sustainable business model. We discuss a Public-Private Partnership (PPP) model with a division of responsibilities for setting up the charging infrastructure. The primary objective of the business model is to promote both small and large scale charging stations across the country.

a Central - State – Private partnership-driven model: In its unique strategy to penetrate and build its EV infrastructure, the government has

come with a plan to collaborate with other state governments and private companies. The focus is to provide funding to replace public owned vehicles to make an early impact. The steps include the replacement of public buses with EVs models. Under its AMRUT scheme and funding of $8.3 billion, the government is planning to replace the old public bus fleet with e-buses. It also extends subsidies to states for the use of the electric bus. The move has inspired individual states to come up with their own policy to develop EV infrastructure. Examples include procurement of five hybrid city buses from Volvo and 25 hybrid buses from Tata Motors by Navi Mumbai Municipal Transport (NMMT). Going further, the government plans to replace the IC car fleet of government employees. The move is expected to drive the development of EV infrastructure in public places and other parts of the city. The Department of Economic Affairs and the Ministry of Finance have already added 15 electric vehicles to their fleet. To ensure a seamless shift, the department has also announced installation of 28 charging stations with 24 standard AC chargers and 4 fast DC chargers. The PPP model proposed is as follows:

1. The centre government (GoI) provides funds to states to replace public transport and government vehicles with EVs.
2. The state government is responsible for the development of charging infrastructure for public vehicles. Responsibilities include identification of the location of charging stations, provision of adequate land, invitation of tender and selecting equipment supplier.
3. Private involvement includes leasing out land in return for rent, setting up CS and generating revenue from the service.
4. The equipment manufacturer provides the charging equipment. State government are expected to provide aid in establishing CS.
5. Power distribution companies provide the required electrical connectivity.

The PPP model involves various stakeholders, establishing synergies and creating a win-win proposition for all. It is best suited for the initial stage of the market where promotion and creating awareness of EV is essential. The significant role is played by central and state governments in providing required capital and financial support. However, it is possible that the government might not get private partnerships. In such a case, the government may consider going solo to drive the market towards EV. We call this a government-driven model.

b Government driven business model: In the government-driven business model, the complete responsibility of developing infrastructure and driving demand growth lies on the government. The model is centred on the proposition that because of the significant capital requirement, uncertain rate of return and high risk, attracting sufficient private players would be a task. Hence government will assume complete accountability, right from procurement, establishing and maintenance of infrastructure facilities and revenue collection. In India, with numerous government-controlled offices and a large fleet of government buses and cars, it is capable of creating demand even by considering replacement of the existing fleet. The supporting infrastructure can be built with help of the public sector power companies in public office space. The government can even consider inviting the state-owned petrol marketing companies to build CS on their owned land and gradually shift their base from oil and gas to electric. Along with this, it is necessary to bring in a policy for the phasing out of petrol and diesel vehicles by bringing in a sunset policy.

Under this business model, the charging infrastructure is owned, operated and maintained by the public equipment supplier. Example of such supplier is ELSS, which is a 100% government-owned and a joint venture of state-owned Power Finance Corporation, NTPC Limited and Rural Electrification Corporation. The business model is suitable when the government is unable to find sufficient private partnership or seeks control of the market. It requires adequate funds, expertise in technical areas, and the ability to take on high risk.

As the demand grows, the market will attract private players to cash in on the opportunity by developing infrastructure. In such case, automakers will roll out models and collaborate with existing CS owners to add capacity. Over time, the business will take the shape of a manufacturer driven business model as discussed below.

c Manufacturer driven business model: In the manufacturer driven business model, the manufacturer senses the opportunity to set its own charging infrastructure. The incentive is to leverage its accumulated knowledge of EV, regarding vehicles compatibility, battery type and its ability to provide maintenance. The private manufacturers own the full responsibility of acquiring land, setting up the infrastructure and running operations. It also provides them with the opportunity to do marketing of their product, gain customer confidence and spread awareness of EV models. The model will not only improve electric mobility but will also provide manufacturers with a new revenue stream generated by collecting service charges at market rates. However, the model has a shortcoming that, to eliminate competition and promote its EV model, the manufacturer may install proprietary charging infrastructure, thereby limiting the interoperating capability of CS. Tata Motors is an example of such a business model with its own charging

stations compatible with its cars.
However, the model will also attract foreign investment in manufacture and establishing R&D capabilities. The private sector is expected to operate its own CS only in high density and profitable cities with substantial EV penetration. We cannot expect investment in tier 2 or tier 3 cities, where demand is limited. Hence this business model is applicable for the matured market.

Conclusion

With investment-backed policy changes, the Government of India has made its stand clear on the future of EVs in India. These changes have led to increased penetration of EVs in the Indian market. There is a need to establish adequate infrastructure and sufficient charging stations across the country. Government's aim is to provide one CS in every 4x4 area in the city and on both sides of the highway for every 25 km. This requires considerable capital and financial resource. To ensure a sustainable ecosystem, we need to look for PPP in initial stages of market maturity. The focus should be to develop business models so that the industry can grow and become self-sustainable.

Besides, the demographic diversity and unique market structure can help the country develop its technology around these demands. Developing technologies to meet the high demand for two and three wheelers will provide it with a first-mover advantage and place it higher on the learning curve. It can aim to become a global leader and cement its place and market share in economic class segment vehicles. The EVs also provide an opportunity for India's power sector to deleverage and improve its balance sheet. Power sector plays an essential role in developing and building infrastructure for EVs. Private and public power companies can look to develop technology to provide better service. Investment in improving technology is likely to pay off in the future as the opportunity is vast.

In this article, we have discussed the government policies and proposed business models that can be tailor-made for India. The use of different business models depends on the evolving market scenario. The decision of choosing a particular business model relies on the importance of ownership and the level of control that the government wants. Studies suggest that more responsibility and ownership should be handled by the private sector, given the efficiency and competitive nature of the work. With its share of setback and challenges, India's EV market looks promising and poised to grow. It is also expected to create social value for society by generating employment and business opportunity. The vast market size will accommodate many competitors and the success will be shared among different players. The growth will be bolstered by the citizen's changing mindset and realisation of the need for clean air.

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