

## Feasibility of Electric Vehicles in India

*By Jacob Thamarappally,*

India is currently in the midst of a full-blown air pollution crisis. While pictures of entire cities engulfed in dense smog might garner national sympathy, albeit for a few weeks, a further inquisition into the numbers paints an even more harrowing picture. In India, the annual death toll from air pollution currently exceeds 1.6 million every year. Lung cancer is now the second largest cause of death after cardiovascular diseases, and it is increasingly affecting younger people as well as non-smokers. And while worldwide air pollution is ever on the rise, India has proved itself to be the epicentre of the crisis. The fact that 11 out of the 12 most polluted cities are located in India, as reported by the World Health Organization, is a testament to the scale of India's precarious situation.

In India, the transport sector emits an estimated 261 Tg of Carbon Dioxide, of which 94.5 per cent is contributed by road transport. The main pollutants discharged by vehicles consist of CO, unburnt HC, Pb, NO<sub>2</sub>, SO<sub>2</sub> and SPM from tailpipes. In total, by most estimates, vehicular pollution contributes to around 22.5 per cent of the total pollution. This pollution has concrete effects on the daily lives of citizens. A study by the International Council of Clean Transportation estimates that as much as two-thirds of all deaths from air pollution in India can be attributed to combustion engines.

It is important to note that the amount of pollution caused by different groups of automobiles vary drastically. For instance, two wheelers and trucks account for about 70 per cent of all PM10 particles in the atmosphere. This can be mainly attributed to the laxity in regulations on these types of vehicles as compared to four wheelers. Around 70 per cent of three wheelers in India still use a two-stroke engine, which is highly polluting. Similarly, heavy duty trucks have been the slowest in reducing and improving their emission standards, as these standards are not uniform across the country.

There is no simple answer to the problem of air pollution. A situation as bad as India's must be addressed in a multi-faceted, holistic manner. One obvious solution would be to reduce the pollution from vehicular exhaust. In order to achieve this, the government has pushed for the electrification of vehicles in India. Electric vehicles (EVs) in the country have a tumultuous history. In the past, we have seen a flurry of proposals that have often been later redacted; for instance, in 2017 Transport Minister Nitin Gadkari famously announced that he intended for India to move to 100 per cent electric cars by 2030 to the shock of auto manufacturers in the nation. These plans were later diluted, from a 100 per cent electric future to a mere 30 per cent.

### Concerns over an Electric Future

However, while the idea of an electric future sounds enticing on a conceptual level, in reality EVs come with their fair share of concerns. First, despite emitting negligible amounts of tailpipe emission, EVs still produce copious amounts of tiny pollution particles from brake and tyre dust, and no safe limit has been accepted for it. These fragments of micro-plastics from road surfaces, tyres and brakes will not only enter into the atmosphere, but could find their way into rivers, and eventually seas. Also, these fragments are quite a large contributor to pollution. A report from the British government claimed that about half of all particulate matter comes from these sources. To add to this, should EVs ever become widely used, it would require an unprecedented amount of electricity. By 2040, global electricity consumption from EVs is estimated to grow to 1800

TWh. This would amount to an extra 510 megatons of carbon emissions coming from the electricity sector worldwide. Simply put, renewable energy just does not have the widespread popularity, especially in India, for it to put a major dent in the amount of coal used to produce electricity. The factories in which EVs are produced are also more polluting than those of conventional vehicles. The global warming potential from electric vehicle production is about twice that of vehicles that use an internal combustion engine. This is because the battery production of these vehicles requires the extraction and manipulation of a range of metals that contribute to carbon emissions.

### **Implementation Concerns in India**

Questions over the implementation of EVs in India also loom large. One of the main problems with shifting towards the so-called electric future is the actual sourcing of the energy required to produce electricity. India is still heavily dependent on coal as its primary source of energy. Despite some efforts from the government to promote renewable resources – a plan to install 175 GW of renewable energy by 2022 – India still would depend on coal for almost 48 per cent of its energy requirements by 2040. Even if the government succeeds in implementing these renewable energy plans, in the grand scheme of things, renewable energy would only account for 16 per cent of India's power requirements by 2040.

Another cause for concern is whether the country's electricity grid would be able to handle a future in which EVs are more widespread in the country. India would need to modernise its power grids and sub-stations to have a dedicated capacity for the EV industry. One way to circumvent this problem would be to promote the overnight charging of EVs. Many EV users in India are already forced to do this because of the lack of ubiquitous charging infrastructure in the country. Overnight charging would allow for EVs to use 'off-peak' and surplus power. It would also allow them to charge using the less expensive slow charging approach. However, if we are to see EVs truly flourish in the country, it would require a ubiquitous charging infrastructure across the country that includes fast charging facilities. This would be the only way to quell the fears that EVs do not have enough range to undertake long trips. Currently, India has only 350 public EV chargers as compared to more than 200,000 that China possesses. Should India ever come even close to this number, it would put added pressure on the country's electricity grids that are already under stress due to the huge subsidies to the agricultural sector, high rates of theft and pilferage.

Finally, while EVs when implemented properly do have their environmental benefits, they are still a means of personal transportation. India requires a paradigm shift in the transportation sector which would move us away from relying on an individualised system towards a greener vision that combines effective public transportation with principles of walkability. According to a UN report, 58 per cent of India's population is set to live in urban areas by 2030. Therefore, measures must be taken to provide sustainable mobility in the future. More EVs on the road will do nothing to solve the existing problems like congestion that plague many Indian cities. The acceptance of electric buses in India has been historically slow, mainly due to the large price difference compared to conventional buses. However, more recently, under the Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme, a proposal for the deployment of 5595 electric buses has been approved. Despite these efforts, problems like high price and lack of charging infrastructure prevent electric buses from taking the next step and becoming the primary mode of transport in the country.

Thus, there are a number of impediments to the widespread adoption of EVs in India. The industry in its current stage in the country is far from ideal – both in terms of viability and implementation. Structural changes have to be implemented on various fronts to allow EVs to become financially and environmentally viable in the long run.

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