

# India's path to electric mobility

Maddyness is collaborating with environmental publication Ours to Save to bring readers fresh perspectives on sustainability. India is home to 22 of the world's 30 most polluted cities. The transport sector is responsible for a significant amount of air pollution in the country - as is encapsulated in Delhi, its capital. How will the country's EV rollout work?

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As India's urban population increases, it is essential to address the pollution and climate risks that come with a fossil fuel dependent transportation system. Electrifying the transport sector shows considerable promise in addressing them while capitalising on future opportunities in the automotive sector.

Electric vehicles (EVs) have no tailpipe emissions, and emit 35% less CO<sub>2</sub> than their internal combustion engine (ICE) counterparts. EVs can convert around 60% of the electrical energy from the grid to power at the wheels, making them highly efficient. In contrast, conventional petrol vehicles only convert about 20% of the energy stored in petrol to power at the wheels.

According to a report by the World Business Council on Sustainable Development, India could abate emissions of 61 Mt CO<sub>2</sub> emissions per year by adopting 30% electric vehicle sales in the 2019-2030 period. This is equivalent to planting 1.1 million trees per year in 2030 - a significant step towards tackling climate change.

# Status quo: an overview of India's automotive industry

India's auto industry creates about 30 million jobs and accounts for 7.1% of the country's GDP. The market is dominated by the two-wheeler segment, which accounts for around 75% of the market share.

98% of vehicles are either small and affordable vehicles (two-wheelers and economy cars) or public transport and goods vehicles (three-wheelers, small goods vehicles, buses and trucks). Only 2% of the vehicles are high-end cars – unlike in developed countries where such vehicles constitute the dominant segment.

Furthermore, the average trip distances and speeds in India are lower than those in developed countries.

*Thus, it is essential for India's clean mobility transition strategy to be unique, and not simply mimic that of other progressive countries.*

## EVs in India

Countries such as the US and China are massively subsidising their EVs. India, which announced its National Electric Mobility Mission as early as 2011, has already shown eagerness to electrify its transport sector. The FAME scheme launched under this mission – aimed at stimulating EV growth in India – is currently in its second phase.

The Department of Heavy Industries (DHI) of India sanctioned 5595 electric buses under the FAME II scheme. Furthermore, India's Energy Storage Mission aims to encourage domestic battery manufacturing and reduce dependence on imported batteries or fossil fuels.

Alongside the government, the private sector is also pushing for EV adoption. Companies such as EY, Accenture and Google have already taken steps to electrify their employee transport fleets. In addition, ride-sharing services such

as Uber have already deployed EVs in Hyderabad. Delivery services are also transitioning their fleets to EVs. For instance, Swiggy, a food delivery company, is planning to pilot the use of EVs in ten cities in India and Walmart-owned Flipkart pledged to electrify 100% of its delivery fleet.

The growth of enterprise in the electric mobility space in India is another promising sign in the right direction. Indian EV startups have raised USD 601 million in the last five years, signifying faith in the ecosystem from venture capital.

## Roadblocks

Despite these strides, EV adoption in India has not reached scale. This is largely due to the fact that the government did not push the clean mobility revolution in India till 2017.

Range anxiety – the fear that the vehicle will run out of charge before reaching its destination – as well as the economic feasibility of EVs and a lack of adequate energy storage are often cited as concerns that have slowed down India's clean mobility transition.

*By addressing these challenges, the way forward on India's clean mobility transition can be smoother and accelerate us closer to a low-carbon future.*

## The way forward: overcoming the roadblocks

### Addressing range anxiety

Many believe that EVs do not have the adequate range to satisfy daily travel needs in India. However, according to WRI India, 71% of the population travels less than 5 km per day. This is significantly different to consumer behaviour in developed countries, where average trips lengths are longer.

In addition, the speed limits in developed countries are higher than in India,

and the heterogeneity of traffic means that trip distances and speeds are shorter. Thus, smaller batteries would be better suited to EVs in India. For longer trips, battery swapping – where a discharged battery is swapped for a fully charged one at a charging station – can be useful in eliminating delays associated with AC slow charging.

Enabling the creation of a high-density network of swapping and public recharging infrastructure can effectively address range anxiety. India has recently taken steps in this direction, by establishing public charging stations, such as those set up by EESL in Delhi.

### Improving economic feasibility

Although the initial upfront cost of EVs is higher than traditional ICE vehicles, EVs have minimal operational and fuel costs. For high-use cases (when the automobile travels large distances daily), EVs can be more economical than their ICE counterparts.

To usher in India's clean mobility transition, it makes sense to first focus on the electrification of public transport, two-wheelers, fleet vehicles, autorickshaws, and taxis (which make up 98% of the market) instead of high-end cars. By focusing on affordability and scalability, India could establish a paradigm that could be replicated in clean mobility transitions in other emerging markets.

Electrifying urban delivery services, ridesharing services and corporate employee transport services has already shown impressive results in this area. Many India-based organisations such as Flipkart, State Bank of India (SBI) and Wipro have already committed to transitioning their fleets to 100% EVs by 2030, under the Climate Group's EV100 initiative. Startups such as ShuttI and Blusmart in India show considerable promise to electrify the ridesharing space.

In addition, it is essential to electrify the last mile – the short distance connecting mass transport stops such as metro stations to travellers' end destinations. Key steps toward electrifying the last mile include the significant growth in the number of e-rickshaws (in the 3-wheeler rideshare segment) in North India. This success story could be crucial in tackling air quality issues in Delhi. In addition, electrifying the last mile in the goods delivery sector also shows significant promise towards this objective.

The total cost of ownership (TCO) of an EV – the sum of its initial capital cost and recurring expenditure such as fuel – can be at par with ICE vehicles for certain use cases such as employee transport, ride-hailing and deliveries. Resources such as the TCO evaluator by WRI India can illustrate how to achieve cost parity for EVs against their ICE counterparts.

Banks could also help reduce high capital costs by offering creative financing models. SBI's Green Car Loan scheme is one such example in this area. By coupling government subsidies with such schemes, TCO parity for EVs can be achieved earlier – shifting a key lever in India's clean mobility movement.

### Upgrading energy storage infrastructure

A lack of adequate charging infrastructure in India is another key barrier. EVs mostly use Li-ion batteries and materials like lithium, cobalt, nickel, manganese and graphite – which are not found in India and hence, need to be imported.

Fortunately, WRI India has suggested that Indian startups have made significant progress in this area by taking used batteries and recovering almost 90-95% of the materials using a zero-effluent process.

On a macro level, India's Energy Storage Mission aims to massively incentivise domestic battery manufacturing. In line with the government's 'Make in India' initiative, this mission effectively addresses the final roadblock to successfully usher in India's clean energy transition.

Air pollution in India was attributed to 1.2 million premature deaths in 2017. By electrifying the automobile sector in the decade of action, India has a unique opportunity to reduce urban air pollution and congestion, while simultaneously emerging as a leader in the worldwide clean mobility transition.

*This article was originally published on Degrees of Change, a community working to demystify climate change and sustainability in India and the world. Tanmay Takle is the cofounder of Degrees of Change and a Student Energy Leaders Fellow at Columbia University.*