

| GUEST VIEW

A route map for our country to attain a future of clean mobility

India's plan to revolutionize travel and curtail exhaust emissions must focus on public rather than just personal transport



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The world is at the cusp of a mobility revolution, one in which vehicles will be shared, connected, and have zero emissions. Rapid technological evolution is driving this shift in transportation around world. In a country like

India, more than 80% of the vehicles sold are two- and three-wheelers, which when combined with buses are the preferred mode of travel of a majority of the people. Unsurprisingly then, India is the world's largest two- and three-wheeler manufacturer and second largest bus manufacturer. It goes without saying that electric mobility must encompass this crucial segment to make any difference in the country.

Over the last few years, e-mobility has seen a rapid transformation. Vehicle battery technology is evolving speedily—prices have fallen by almost 84% in the last decade to \$150/kWh, and this is expected to further dip to \$100–20/kWh by 2025. Even as we speak, battery technology is fast developing to look beyond the standard lithium and cobalt chemistry. Solid-state batteries—such as non-flammable aluminium air and zinc air ones—have emerged clear winners for operations in high and low temperatures. The solid ion battery, built on the abundantly available sodium metal, is another alternative to lithium (and it charges almost five times faster than Li-ion), and flow batteries that are vanadium- and ferrous-based are perfect for grid storage.

Recently, the Indian government extended its Production-Linked Incentive scheme to 10 key sectors and marked out an outlay of ₹18,100 crore for advanced chemistry cell batteries. This will provide a boost to the battery manufacturing ecosystem in the country and give a huge impetus to cell manufacturing, along with the domestic manufacturing of cathodes, anodes and separators.

The financial viability of electric mobility has made it more acceptable to the masses. Parity in the cost of ownership has been achieved in all vehicle segments within a five-year time span. In the case of commercial vehicles (like freight and other delivery vehicles), which have emerged as first movers, that time span is even shorter. The cost of electric vehicles (EVs) is also falling rapidly due to technological innovations across the value chain. Alternative ownership models, such as battery-swapping, have brought the cost of EVs on par with, if not below, internal combustion engine (ICE) vehicles.

The push for a transition to green mobility is also supported by the need for pollution to be tackled on a war footing in metropolitan and tier-1 cities; hence, an alternative to fossil-fuel-based mobility needs to be adopted. Exceeding targets for renewable energy generation (75 gigawatts by 2022 will likely be surpassed by 45 gigawatts),

along with the adoption of EVs, will help achieve a cleaner environment.

However, the drive towards clean mobility should not be focused on personal mobility, otherwise we will end up aggravating issues of congestion and never be able to provide our citizens equitable access to transportation. The focus should not only be on adopting EVs, but also on moving people rather than vehicles, which can be achieved through public transportation and its electrification. To push clean mobility in public transportation, the government has undertaken a number of steps. A fiscal incentive of \$1.3 billion has been rolled out to bring an additional 1 million e-two-wheelers and half-a-million e-three-wheelers onto streets. India does not have legacy issues of high car ownership, so it can build the future of transportation on buses and shared mobility. The government has advised states to register vehicles without batteries; it has also done away with the mandatory requirement of spare tyres in cars, which would provide extra space for EV batteries.

As many as 2,636 charging stations across the country and 5,595 electric buses for 64 cities, state government entities, state transport undertakings for intracity and intercity operations under phase 2 of the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME-2) scheme, have been sanctioned. Goods and services tax (GST) on EVs has been reduced from 12% to 5%. Similarly, GST on EV has been reduced from 18% to 5%. The government has also prepared a draft for amending building code and town planning rules to let EV-charging stations be provided in private and commercial buildings.

To speed up the transition from ICE vehicles to EVs, an income-tax deduction of ₹1.5 lakh has been provided on the interest paid on individual loans

to purchase EVs, which amounts to a benefit of around ₹2.5 lakh over the loan period.

The Centre has also exempted customs duty on certain parts of EVs and capital goods used in the manufacture of lithium-ion cells. The requirement of permits has also been exempted for all battery-operated transport vehicles and those running on ethanol and methanol fuels. Customs duty rates have been rationalized for all categories of vehicles to incentivize their use.

Niti Aayog has prepared a concessionaire agreement for public-private partnerships in the operation and maintenance of electric buses in cities on the operating expenditure (OPEX) model.

Already, 15 states have come up with EV policies—including incentives such as single-window clearance, stamp duty waiver, and incentivized land and electricity—that can make India a global hub for the manufacturing of such vehicles.

The electric mobility revolution is driven by power electronics, artificial intelligence and automation; with this in mind, we must harmonize efforts with the Indian information technology (IT) industry. EVs would have higher value addition of electronics and IT components than traditional automobile components. India's IT sector can be an incubator for innovation. Open-source battery management systems could be one area the sector could explore in support of the EV revolution.

India needs to drive electric mobility on the backbone of public and shared mobility. The cities of tomorrow need to embrace transit-oriented development, where public transport would act as the backbone. This will be a key determinant of the ease of living. To provide affordable, inclusive and safe mobility, we need robust zero-emissions-based public transport systems.

These are the author's personal views