

## BUILDING FORWARD BETTER - PATHWAYS FOR A SUSTAINABLE POST-COVID RECOVERY FOR INDIA

# Urban Transport

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## COVID-19 AND INDIA'S ECONOMY

The Covid-19 pandemic had infected nearly 11 million people with over 150,000 deaths in India by the end of January 2021.<sup>1</sup> Combined with the lockdown, India's unemployment rate had touched 27% in April 2020, with over 120 million people losing their jobs.<sup>2</sup> Informal sector wages fell by 23%,<sup>3</sup> and the economy is estimated to have contracted by 9.6% in the calendar year<sup>4</sup>. Public transport capacity and ridership collapsed.<sup>5</sup>

At the same time, traffic congestion, pollution levels, and greenhouse gas (GHG) emissions decreased temporarily, and new ways of doing business emerged, supported by an accelerated shift to a digital economy. Even as there is a need to return to previous levels of growth and employment, there is an equal and simultaneous opportunity to revisit India's long-term sustainable development challenges. For instance, green investments – including public transit, building efficiency, solar photovoltaics (PV), and restoration – can create more jobs per dollar in the immediate term than investments in fossil fuels.<sup>6</sup> In addition to the number of jobs, it is also critical to ensure that the measures taken in this socioeconomic reset are equitable and inclusive.

This policy note summarizes three ways in which urban transport and its associated infrastructure can be reimaged to benefit the economy, environment, and all sections of society.

## WAYS FORWARD

### 1. Improving Public Transport Systems

#### Context

Rapid urbanization and motorization are burdening the current transportation infrastructure in India, resulting in traffic congestion, traffic fatalities and injuries, higher emissions, and increased energy consumption. While it took nearly 60 years (1951-2008) for India to cross 105 million registered vehicles, it took only six years (2009-15) for this number to double.<sup>7</sup> The share of registered buses

however witnessed a reduction, from 11% in 1950 to 0.6% of total registered vehicles in 2016.<sup>8,9</sup> CSE projections estimate a decrease in the share of public transport, from 75.7% in 2000-01 to 44.7% in 2030-31, and a rise in the share of personal transport, to more than 50%, of total passenger kilometers.<sup>10</sup> The share of trips made using public transport is only 7% in India as compared with 86% in Singapore and 29% in Brazil.<sup>11</sup> In the absence of good public transport systems, even smaller cities such as Lucknow, Jaipur, and Chandigarh, which were traditionally dependent on non-motorized transport and paratransit, are now witnessing a rapid shift towards personal vehicles, largely two-wheelers.

In addition to inadequate fleet sizes, the public transport system in India is currently faced with several challenges: the absence of seamless intermodal travel including integrated schedules and ticketing, the absence of a feeder system for first and last mile connectivity, poor quality across various modes of public transport, insufficient coordination with land-use planning agencies, financing challenges that obstruct O&M and fleet renewal, and a lack of dedicated infrastructure for bus transport. Institutional fragmentation makes it more difficult to establish a well-functioning public transport system. For example, in Delhi, the transport system is managed by four agencies: Delhi Metro Rail Corporation (DMRC), Delhi Transport Corporation (DTC), Delhi Integrated Multi-Modal Transport System (DIMTS) and Indian Railways.<sup>12,13</sup> The Ministry of Housing and Urban Affairs (MoHUA) estimates investment needs of INR 21 lakh crore between 2011 and 2031 for urban roads and mass transit systems. Assuming that public transport will be mainly provided by buses, at current ridership levels, an additional 460,000 buses would be required by 2031, in addition to other modes of public transport. However, while the budget for the metro increased from 12% in 2009 to 54% in 2017, there was no commensurate increase for buses or for system integration, even though buses carry far more commuters. Even in metro systems, ridership in Delhi, Mumbai, Chennai, Bengaluru, Kolkata, Jaipur, and Chandigarh showed large deficits when compared with projections.<sup>14</sup>

India imports about 80% of its crude oil, and more than 40% of oil and its products are used to run vehicles. The road transport sector is responsible for 10% of total GHG emissions across sectors. Until 2040, the transport sector will continue to record the highest growth rate in energy consumption – as much as 7% – followed by industry at 6.4% and the building sector at 2.4%. Within the transport sector, energy demand will be driven by the demand from the light-duty segment and heavy-duty trucks.<sup>15</sup> This presents an opportunity for implementing efficient mobility solutions that can encourage travelers to shift from light duty private modes to public transit. In recognition of this, the government allocated INR 18,000 crore to buses in the Union Budget 2021-22.<sup>16</sup>

## Recommendations

- Undertake multi-modal integration, i.e., integration of public, intermediate paratransit and personal – and also non-motorized – modes of transport allowing seamless travel and increase in ridership, and institutionalize such planning and action by:
  - Revamping to a system of unified governance wherein a single agency plans, monitors, and finances the entire public transport network, ideally through structured contracts with private operators.
  - Facilitating ease of operation by creating open platforms for operators of all modes to share data and making it mandatory for operators to conform to an open data protocol. This may help allocate public funds in line with usage, equity, and other policy goals.
  - Regulating private mobility services so that they operate as complementary to, rather than in competition with, public transport and public taxi services.<sup>17</sup>

- Frame an overarching policy for pricing of all transport services and adopt innovative strategies for financing, such as land value capture and non-user beneficiary tax, or a change in procurement models, to revamp and support public transport and ensure quality and continuity of service.
- Leverage technology and encourage innovation to enhance efficiency, safety, and user convenience. A recent example is the cashless mobile ticketing solution for buses by the Delhi Government.<sup>18</sup>
- Coordinate with land-use planning agencies to plan new development in tandem with public transport infrastructure and reform regulations to increase density in public transit corridors.
- Implement travel demand management (TDM) measures to encourage shifts away from private vehicles, such as vehicle ownership quotas and pricing of congestion or parking.

## Benefits

- Economics and Employment
  - Traffic in urban India is slow even outside the peak hours of traffic, in both large and small cities. India's mean travel speed across cities is just 24.4 km per hour, against a mean travel speed of 38.5 km per hour in metropolitan cities in the US.<sup>19</sup> Increasing the use of public transport has the potential to reduce traffic congestion. While a bus occupies only twice the road space taken by a car, it can carry 40 times the number of passengers.<sup>20</sup> Better uncongested mobility correlates with economic development through the spill-over effects of increased productivity (fewer person-hours lost in traffic), lower spending on fuels, and less wear and tear of roads and tires. Additionally, investments in public transport infrastructure would create direct and indirect jobs.
  - The World Health Organization has identified the dependence on private motorized transport as one of the major factors for the worsening air pollution in India. Indian cities have among the highest levels of particulate matter (PM10 and PM2.5), as compared to those in other countries. In 2019 alone, 1.7 million people in India died of air pollution. India lost 1.4% of its GDP due to associated premature deaths and morbidity, equivalent to INR 2,60,000 crore.<sup>21</sup> The increased use of newer, cleaner, and more efficient public transport can improve air quality. Reducing the economic burden of air pollution in this manner would imply fewer fatalities, reduced health care costs, and increased productivity in the labor force.
- Emissions and Pollution
  - A trip of 10 km taken by a person emits 0.01 grams (g) of particulate matter if the ride is on a bus, 0.08 g in a car, 0.1 g on a two-wheeler and 0.46 g if it is in an auto-rickshaw. Cities that have a decent public transport spine, together with a compact urban form, smaller numbers of personal vehicles, and fewer vehicle-miles travelled, emit fewer GHGs and toxic pollutants and consume less energy.<sup>22</sup>
- Equity and Vulnerability
  - Sustainable public transport is more inclusive than a reliance on private modes of travel. The poor tend to live as close to their workplace as possible to keep their commuting distance short and to minimize transportation costs.<sup>23</sup> Strengthening the public transport system and prioritizing affordability would benefit those at the lower tiers of the income pyramid, and increase access to more distributed sources of employment, education, and healthcare.

## Potential Challenges

- It may be challenging to find a balance between the financial sustainability of public transport and addressing access concerns among the poorest and most vulnerable.
- New models of contracting, especially with private operators and public-private partnerships, will require rethinking existing models of governance.
- In the short term, agencies will need to address hesitations about using public transport that have arisen due to Covid-19.

## 2. Electric Vehicles and Charging Infrastructure

### Context

Even as public transport systems develop and grow, private vehicle sales will continue to increase in the medium to long term. Although India's auto sales are projected to be 30% lower in 2020 than in the previous year,<sup>24</sup> the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) scheme encourages the increasing adoption of electric vehicles (EVs) across buses, four-wheelers, three-wheelers, and two-wheelers, in place of traditional fossil fuel-based vehicles. The scheme creates demand incentives for buyers and end-users of EVs and urges the deployment of charging technologies in urban centres. The central government has also reduced GST on EVs and charging stations in 2019.<sup>25</sup>

States have shown an interest in establishing an EV ecosystem; 11 states have notified or drafted specific EV policies, including provisions such as a special tariff for EV charging, building bylaws to incorporate EV charging, experimenting with e-buses in state transport fleets, and so on.<sup>26</sup> Most recently, the Delhi government has mandated that all vehicles of the government should be replaced by electric ones within six months.<sup>27</sup>

By 2025, the value chain of EVs in India is expected to reach USD 4.8 billion. Relevant to this, the Covid-19 fiscal stimulus packages mobilized credit of USD 40.12 billion to MSMEs, with a 100% guarantee and a one-year moratorium. This is significant as MSMEs are typically strapped for working capital.<sup>28</sup> Additionally, the government expanded the definition of medium enterprises as being those with turnovers below INR 250 crore, since many mid-size firms did not previously fall under the definition of MSMEs, and as a result did not qualify for government benefits. With this move, many of the companies in the EV sector have benefited and are able to sustain production during the pandemic.<sup>29</sup>

Of total EV sales in FY20, 1.52 lakh units were two-wheelers, 3400 were cars, and 600 were buses, with total sales up 20% over the previous year.<sup>30</sup> Rickshaws, autos, and two-wheelers are the most promising segments for electrification in India and are expected to account for over 40 lakh units by 2025.<sup>31</sup> The outlook for the industry remains positive, with 30-35% of sales expected to be electric by 2025.

Although the total cost of ownership of EVs is already lower than traditional vehicles in some categories,<sup>32</sup> current barriers to EV uptake in India include high upfront costs, uncertainties related to evolving battery technology, the absence of a stable EV manufacturing base, the lack of charging infrastructure, the limited penetration of vehicle ownership, and other behavioral considerations

## Recommendations

### ■ Supply Side

- Though the voluntary vehicle scrapping scheme announced in the Union Budget 2021-22 is a welcome step, initiate a broader scrappage program for traditional fossil fuel-based vehicles and follow a policy of incentivizing the EV sector using subsidies and tax relaxation.
- Support the global EV component industry by pursuing low-cost production opportunities, particularly as other countries look for low-cost outsourcing solutions amidst the current economic slowdown.
- Support the domestic auto industry through bailouts that are conditional upon a transition to higher shares of EV production, similar to auto industry bailouts in the US after the financial crisis of 2008-10,<sup>33</sup> such as production-linked incentives (PLIs).
- Revisit the GST on electric vehicle batteries, which is still at 18%, and is a hindrance to battery swapping.
- Include a requirement for charging infrastructure in building codes.
- Coordinate with land use planning agencies, as well as with the Ministry of Road Transport and Highways (MoRTH), Department of Heavy Industry (DHI), and NITI Aayog. Also collaborate with electric utilities/discoms to scale up EVs without overburdening the grid, and in line with investments in improving grid reliability.

### ■ Demand Side

- Reduce the costs of financing for EVs, as finance will play a crucial role in scaling them up in India. 75% of total vehicle sales are financed; however, there are no standard policies for EV finance. The Delhi Government's EV policy, which provides a 5% interest rate subvention for a selected segment of vehicles, is an innovative approach.<sup>34</sup>
- Explore the use of non-financial TDM incentives, such as free parking and differential congestion pricing, in combination with financial incentives, in order to boost consumer demand for EVs. For instance, China and various Latin American countries have implemented vehicle ownership quotas and congestion pricing,<sup>35,36</sup> while Delhi is exploring a new parking policy that will account for time-of-use and vehicle ownership<sup>37</sup>.

## Benefits

### ■ Economics and Employment

- Evolving technology can lead to the growth of the EV industry and support employment opportunities. Several two-wheeler service providers are already exploring opportunities in manufacturing. For instance, Ola Electric Mobility will set up an electric two-wheeler manufacturing unit with an investment of INR 2,354 crore, which will create about 10,000 jobs.
- Lower operating costs, the falling price of batteries, and longer lifespans due to fewer moving parts make electric vehicles more financially viable for consumers in the long run. They can also be deployed at scale to support sub-sectors such as last mile delivery and ride-hailing,<sup>38</sup> as well as regular taxi services and other private innovations in the EV space<sup>39</sup>.
- Electrification presents an opportunity to strengthen the country's role – and move upstream – in the global EV value chain. It can help boost exports and increase self-reliance.
- Conversely, India's oil import bill in 2019 was USD 112 billion.<sup>40</sup> A shift to EVs would help improve the balance of trade and India's energy security position.
- Electric vehicles, used strategically together with broader electricity demand response measures, can help support financially stressed discoms.<sup>41</sup>

- Emissions and Pollution
  - Growth in the share of EVs will lead to fewer GHG emissions, particularly as the electricity grid transitions to greater generation from renewable sources.
  - It will also reduce emissions of nitrous and sulphuric oxides, thereby contribute to reducing air pollution.
  - If used in combination with other electricity demand response measures, EVs can aid in the transition to clean energy.
  
- Equity and Vulnerability
  - EVs can support livelihoods through innovative business solutions. For instance, SMV Green transitions cycle rickshaws to e-rickshaws for last mile connectivity, thus improving livelihoods of rickshaw owners. It also trains women drivers and empowers them to earn their own livelihoods.<sup>42</sup>
  - Since EVs can support shared mobility and public transport fleets, they can increase access and mobility for middle- and lower-income groups as well as women commuters.
  - Since air pollution and climate change disproportionately affect lower-income groups, a faster transition to EVs can increase the resilience of the most vulnerable.

### Potential Challenges

- A push for electric mobility can expect resistance from traditional car firms, auto components manufacturers, and oil companies.
- The grid implications of charging infrastructure will have to be carefully managed.
- Government revenues from the current fuel taxes and GST – and spending through PLIs – may be affected; these should be estimated and may be offset through other mechanisms.
- These recommendations can benefit from a sequencing of reforms to ensure that their implementation does not work against the most vulnerable, for example, by creating an electricity mobility roadmap for the transition.<sup>43</sup>

## 3. Reimagining Streets, and Improving Cycling and Pedestrian Infrastructure

### Context

Despite accounting for only about 2% of motor vehicles globally, more than 11% of road traffic deaths take place in India.<sup>44</sup> Pedestrians, cyclists, and motorized two-wheeler riders are disproportionately injured or killed in road crashes. In the three cities of New Delhi, Bengaluru, and Kolkata, pedestrians account for more than 40% of road traffic fatalities.<sup>45</sup> The environmental costs of increasing motorization in the form of emissions and energy usage are also significant.

A transition to cities with safe, sustainable, and compact streets requires the development of infrastructure that is appropriate for non-motorized transport (NMT) and an approach to urban development that recognizes the multiple dimensions of NMT-friendly streets. In the Indian context, several challenges need to be addressed. For instance, the distinction between ‘street’ and ‘road’ is blurred, because of which the country has more roads and fewer streets. The concept of a street as a destination, with functions and social usability of its own, rather than simply a thoroughfare, is not clear. Further, even though nearly 60-75% of the urban population in India walks, cycles, or uses public transport, infrastructure investment plans ignore the requirements of this section and

are instead dedicated to motorized transport, which caters to a minority. As cities sprawl, the share of NMT (walking, cycling, and other variants such as small-wheeled transport) reduces drastically, creating an increased reliance on motorized transport. Average travel distances have increased in all cities, and the threat of losing walking and cycling space to motorized transport is greater in smaller cities that have not invested either in infrastructure for NMT or in formal public transport. For instance, the Comprehensive Master Plan for Indore revealed that 75% of the city does not have footpaths. A study of the development and mobility plans of 12 cities between 2005 and 2007 revealed that except for the 5.6 km busway in Delhi and 10 km of exclusive bikeways in Pune, none of the cities had dedicated infrastructure for cyclists.<sup>46,47</sup>

These issues are compounded by the fact that city administrations are not typically headed by transport planners, resulting in solutions that focus on moving vehicles, and not on moving people.<sup>48</sup> Local policies too have contributed to curtailing the use of NMT modes. For example, since 2012, cycling has been restricted in 174 roads in Kolkata in order to provide uninterrupted flow of vehicular traffic.<sup>49</sup>

The lockdowns imposed during the peak of the Covid-19 pandemic in 2020 triggered a reclaiming of public spaces by pedestrians and bicyclists in several countries including India. Limited public transport options, the need for safe commuting and social distancing, and a search for alternative recreational activities led to the increased popularity of cycling. In India, the market witnessed a surge in demand for bicycles not only in the metros but in smaller cities as well.<sup>50</sup> While this disruption may have changed the perceptions of urban residents towards walking and cycling, without concrete measures to promote safe NMT, this opportunity may be wasted.

## Recommendations

- Employ a people-centered approach to urban street planning and design. State and municipal budgets should be encouraged to prioritize pedestrianization. Design solutions must effectively serve pedestrians, cyclists, public transport users, and other public activity. Vulnerable groups including children, the elderly and physically challenged, and those who operate and participate in the street economy must be prioritized as well.
- Develop guidelines for creating a hierarchy of urban streets that provide continuous infrastructure. Design principles must incorporate the following principles to achieve a safer environment:
  - Urban design that reduces the need for vehicle travel and fosters safer vehicle speeds,
  - Traffic calming measures that reduce vehicle speeds or allow safer crossings,
  - Arterial corridors that ensure safer conditions for all road users,
  - A network of connected and specially designed bicycling infrastructure,
  - Safe pedestrian facilities and access to public spaces and
  - Safe access to mass transport corridors, stations, and stops, with intermodal integration.<sup>51</sup>
- Foster an integrated and inclusive approach to capacity building of urban local bodies by creating in-house street design cells consisting of planners, urban designers, architects, engineers, and other professionals relevant to the field.
- Invest in on-the-ground change by allocating adequate funds to state and city-level authorities and bodies. Create a system of incentives to encourage the prioritization of sustainable infrastructure.
- Encourage innovation and experimentation in street planning and design and promote sustainable and locally suited technologies and processes.

## Benefits

### ■ Economics & Employment

- Investing in pedestrian and cycle infrastructure and improving road design can result in safer mobility. Successfully halving road deaths and injuries between 2014 and 2038 could potentially add 14% to the GDP per capita.<sup>52</sup> An analysis of the impact of a bus rapid transit system that was introduced in New Delhi, with detailed designs for exclusive bicycle lanes and pedestrian-friendly crossings, with the aim of reducing conflicts between pedestrians, cyclists and buses, revealed a 60-90% reduction in pedestrian fatalities in 10 high-risk locations.<sup>53</sup>
- An increase in the use of non-motorized transport would have a positive impact on air quality. In 2019, the economic impact of lost output from premature deaths and morbidity attributable to air pollution was equivalent to 1.36% of India's GDP. A further source of economic loss is the health costs of treating diseases attributable to air pollution. Based on National Health Accounts data, the total healthcare cost in India in 2019 was estimated to be USD 103.7 billion. With air pollution responsible for 11.5% of the disease burden in India in 2019, a crude estimate of the healthcare cost for air pollution-related diseases would be USD 11.9 billion (or 0.44% of India's GDP).<sup>54</sup>

### ■ Emissions & Pollution

- Walking and cycling are energy-efficient modes of transport and use resources with lower operations and maintenance requirements. Each kilometer cycled helps avoid the emission of 0.250 kg of carbon dioxide, and walking to a destination can help avoid more than 75% of GHG emissions as compared with private vehicles.<sup>55</sup> It has direct implications on air pollution, noise pollution as well as natural resources consumption.

### ■ Equity and Vulnerability

- The poor, who are 'captive users' of NMT in cities for reasons of affordability, are most vulnerable and at the highest risk of injuries and fatal accidents on the roads. A study on road use pattern and risk factors conducted among children in Hyderabad revealed that those in the highest household income quartile were significantly less likely to sustain pedestrian road traffic injuries. Injuries and disabilities from road accidents can affect people's livelihoods and push them further into poverty.<sup>56</sup> Studies reveal that poor households are pushed into debt by borrowing money to meet out-of-pocket expenditure on medical care in addition to losing livelihoods and income following accidents.<sup>57</sup> Investing in NMT-friendly infrastructure is a pro-poor investment, having far-reaching implications in reducing vulnerability and poverty.
- There is strong evidence of the public health benefits of physical activity among children, adolescents, and adults in the form of improved cardiorespiratory health, lower risk of early death, improved bone health, improved mental health, lower risk of type-2 diabetes and high blood pressure, etc. A University of Cambridge study indicates that air pollution risks will not negate the health benefits of active travel in most urban areas worldwide, even in cities with high levels of air pollution. In Delhi, people would need to cycle over five hours per week before the pollution risks outweigh the health benefits.<sup>58</sup>

## Potential Challenges

- A focus on NMT may involve reconsidering urban development codes and parking regulations, and revisiting the interactions between vehicles and people.
- Planners will need to ensure a just transition, in terms of the impacts on areas that might be cut off from transportation, infrastructure, and opportunity.



- Implementing these recommendations would require further study of commuting patterns and congestion.

## CONCLUSION

Policymakers should rethink transport planning by promoting electric mobility solutions together with incentivizing integrated public transport use, while focusing on making streets safer and more pedestrian-friendly. These measures will support growth and job-creation, reduce traffic congestion and fatalities, reduce lost productivity, improve ambient air quality, and increase access for the most vulnerable, thereby creating more liveable cities overall.

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