SECTOR ASSESSMENT (SUMMARY): TRANSPORT (RAIL AND URBAN)\(^1\)

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. **Urban transport.** Efficient and sustainable urban transport systems and mobility are critical for the smooth functioning of India’s cities. From 1981 to 2011, the number of total registered vehicles grew at a rate of 11.7% per year, compared to population growth of 2% per year.\(^2\) The rapid increase in the number of vehicles has led to severe air pollution, which is becoming a serious health hazard in many cities. The government is consequently committed to promoting public transport systems. Public transportation infrastructure in India needs high levels of investment and massive upgrading to spur a modal shift from private vehicles. It is estimated that over 50% of Indians will be living in urban areas by 2050.\(^3\) In 2006, the Government of India issued the National Urban Transport Policy (NUTP) that provides a broad framework for development of urban transport.\(^4\) Metro rail is seen as a necessary solution for developing mass rapid transit systems in India’s large cities, while smaller and medium-sized cities are exploring the option of bus rapid transit.

2. In India, the states and union territories plan, execute, and develop urban transport facilities. However, the current suburban railway system is within the purview of the national railway administration. Indian Railways has been operating suburban rail services in Chennai, Delhi, Hyderabad, Kolkata, and Mumbai, as a means of rail-based mass transit with a focus on long-haul freight and passenger movement. The Ministry of Railways intends to relinquish direct control on suburban rail services and instead to jointly participate with state governments through a special purpose vehicle; thus in the future, urban transport will be the responsibility of the respective state or city administration. This will enable the integration of operations and management of the existing suburban rail systems with that of the new metro railways.

3. **Metro rail sector.** The country’s first rapid transit system was the Kolkata Metro, which began operations in 1984, and the second was launched in New Delhi in 2002. The Delhi Metro has the country’s largest network and established good practices of metro project implementation and operation and management, backed by a strong institutional mechanism of acquiring, accumulating, and scaling expertise within its organization, such as an extensive training program.\(^5\) Following the success of the Delhi Metro, many Indian cities began exploring options to implement metro rail projects. There are currently 10 operational rapid transit (or metro) systems in India. As of November 2017, India has 425 kilometers (km) of operational metro lines and 347 stations. Another 500 km of lines are under construction. The newest metro opened in Hyderabad on 29 November 2017.

4. **Public–private partnerships experience of metros in India.** The public–private partnership (PPP) model as part of the Metro Rail Policy (2017) aims to lessen the burden on the national government in funding metro projects. The first PPP model for a metro line was tried in

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the airport line of the Delhi Metro Rail Corporation (DMRC). The line opened in February 2011 after several delays. Services were suspended in July 2012 due to a series of technical problems. The private company could not continue operating the line, which was eventually taken over by the DMRC. The PPP model was also tried for Mumbai Metro Line 1, the first line of the network connecting the 11 km section between Andheri and Ghatkopar, which became operational in 2014. Ridership on the line remained below the projected numbers, thus limiting its financial viability. The private company’s requests to increase fares were not agreed to by the government.

5. The major issues related to PPPs in metro projects in India are commercial viability and procurement of rights-of-way and land. Metro projects are highly capital intensive. Private participants look for a return of about 12%-15%, while metro projects typically yield a return of 3-4%. Metro projects take a long time to reach a break-even point. Returns can only be generated by steep fare hikes, but such an approach is problematic for various reasons. The magnitude of revenue generation is uncertain in most public transportation projects.

2. Government’s Sector Strategy

6. The National Urban Transport Policy (2006). The government’s NUTP (footnote 4) emphasizes increasing ability at the state and city levels to address problems associated with urban transport, and sets guidelines for developing sustainable urban transport systems. The objective is to enable safe, affordable, quick, comfortable, reliable, and sustainable access by residents to jobs, education, recreation, and other activities within cities. In 2006, the NUTP proposed the construction of a metro rail system in every city with a population of at least 2 million. In August 2014, the government announced that it would provide financial assistance to implement metro rail systems in all Indian cities with a population of more than 1 million. In May 2015, the government approved the proposal by the Ministry of Housing and Urban Affairs to implement metro rail systems in 50 cities. Many of the planned projects will be implemented through special purpose vehicles, which will be established as 50:50 joint ventures between the central and respective state governments.

7. Three-Year Action Agenda (2017). The Government of India’s Three-Year Action Agenda also focuses on improved urban mobility and metro rail systems. The report was developed by the National Institution for Transforming India, which is India’s apex planning body. It recognizes that metro rail projects can be an efficient source of public transportation in many cities. The success of some initial metro projects has led to demands for metro projects from other cities. This highlights the need for a national metro rail policy that will ensure that metro projects are not considered in isolation but as part of a comprehensive plan of overall public transportation.

8. Metro Rail Policy (2017). The policy sets out norms and guidelines for the development of metro rail projects, and conditions for approvals and aids to be provided by the central government for these projects. Two of these conditions are private participation and that the projects ensure last-mile connectivity for commuters. The policy allows respective states to formulate rules and regulations and empowers them to establish permanent fare fixation authorities. Furthermore, the projects will be cleared based on an economic internal rate of return of 14%. This is considered one of the widely followed best practices, and will alter the system that runs on the current financial internal rate of return of 8%. Three models are outlined in the policy:

(i) PPP with central assistance, which will be part of the Ministry of Finance’s viability gap funding scheme;

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(ii) grant by the central government, whereby 10% of the metro project cost will be provided by the central government as a lump sum amount; and
(iii) 50:50 equity sharing between the central government and the state.

9. **Value capture policy (2017).** The government will implement a value capture financing (VCF) policy for all infrastructure projects starting in April 2017 to recover the premium that public investments generate for private landowners. The government has decided VCF to be an integral part of the detailed project report for all central government projects. The financing tool, which is used in several countries, is based on the premise that the government makes large investments in developing public infrastructure, which leads to rapid economic development in those areas and a sharp increase in land prices. A VCF policy would enable the government to recover a portion of this value, including through additional taxes and by acting as a realtor, and use the revenue to fund future infrastructure projects in the same area.

10. **Strategy for Mumbai.** In 2003, the Mumbai Metropolitan Region Development Authority (MMRDA) appointed the Delhi Metro Rail Corporation (DMRC), in association with Tata Consultancy Services and the Indian Institute of Technology, Mumbai, to prepare a masterplan for the proposed Mumbai metro rail system to restore the share of public transport in Mumbai. The MMRDA also prepared a comprehensive transportation study for the Mumbai Metropolitan Region (MMR), which sets out timeline goals for transportation and serves as the sector road map. This approach will reduce road transport modes, reduce vehicle emissions, improve the urban environment, and enhance commuter safety and the quality of urban life.

11. **Mumbai Urban Transport Project.** Indian Railways and the Government of Maharashtra, through the MMRDA, the Mumbai Railway Vikas Corporation, and the World Bank, are implementing the Mumbai Urban Transport Project (MUTP) to improve and expand Mumbai’s transportation network to meet growing demand and to reduce overcrowding in suburban railway trains. The MUTP phase 1 was sanctioned in 2003 and phase 2 was sanctioned in 2008 to undertake the Mumbai Suburban Railway improvement works.

12. Phase 3 is now being prepared, targeting about $7.5 billion of rail-based and railway access improvements. To supplement the MUTP, the MMRDA has initiated a road infrastructure improvement project (the Mumbai Urban Infrastructure Project) with the main objective of improving the road network and creating an efficient traffic dispersal system in greater Mumbai. The total initial project cost is estimated at about $400 million. The major components of the Mumbai Urban Infrastructure Project relate to improving and creating wider road links and grade-separated roads, and improvements such as road markings, foot bridges, and bus shelters.

13. **Unified Mumbai Metropolitan Transport Authority.** The national government requires cities with a population of more than 1 million to establish a unified metropolitan transport authority responsible for preparing an integrated public transport plan. To enhance public transport systems and to solve various transport problems in Mumbai, the MMR and the Government of Maharashtra established the Unified Mumbai Metropolitan Transport Authority in 2008. This has a main committee under the chairmanship of the chief secretary, and subcommittees focusing on various subjects.

14. **Development impact of metro rail system in Mumbai.** Metro rail corridor development should result in substantial improvement to the urban transit system in Mumbai by 2021. It is estimated that the overall public transport share will reach around 80%, primarily due to the extensive metro developments in Mumbai. The table shows changes in projected mode shares from 2014 to 2034. Bus share is expected to drop, with bus service primarily serving as a major
access and egress mode for the suburban train and metro systems. The overall informal public transport and private vehicles share is expected to decrease from around 30% to around 20%. Reduction in mode share of suburban trains will improve travel conditions for commuters, reducing fatalities and accidents associated with overcrowding of trains. The introduction of the metro lines is expected to reduce the number of private vehicles, informal public transport, and bus trips in the city. As motorized vehicles are major contributors to poor air quality, this modal shift can contribute to a better urban environment by reducing vehicle emissions as well as environmental, business, and social costs associated with traffic generation and congestion. Road safety will also improve.

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3. ADB Sector Experience and Assistance Program

15. **Urban transport.** ADB’s involvement in the urban transport subsector in India has been primarily to assist in policy and strategy aspects in line with the country’s NUTP. ADB has also helped in the development of the Guidelines and Toolkits for Urban Transport Development in Medium-Sized Cities in India.

16. **Metro projects supported by ADB.** ADB has been involved in the Jaipur Metro Rail project, where it is helping to extend the first metro train line in Jaipur and to draw up plans to build a second line for the north–south corridor. Outside India, ADB has supported and financed development of metro rail lines in Ha Noi and Ho Chi Minh cities, the two biggest cities in Vietnam.

17. **ADB’s Mumbai assistance program.** ADB has no recent projects in Mumbai but several MMR projects have been or are being implemented with other multilateral organizations. For example, Mumbai Metro Rail Line 3 connecting Colaba–Bandra–Santacruz Electronic Export Processing Zone, which is an underground line of about 34 km, is being implemented by the MMRDA with Japan International Cooperation Agency assistance. The lines proposed for financial assistance by ADB are (i) Line 2A from Dahisar (Charkhop) to D. N. Nagar, (ii) Line 2B for D. N. Nagar–Bandra–Mandale, and (iii) Line 7 from Dahisar (East) to Andheri (East). The aggregate length of these lines is about 58 km.

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7 ADB is currently preparing a separate technical assistance subproject under cluster technical assistance for Strengthening Climate Change Resilience in Urban India, which will help Brihanmumbai Electric Supply and Transport Undertaking identify measures to increase efficiency of its bus operation, including review of its routes due to the proposed development of the metro system in the city.


10 The metro rail line numbers are a legacy of previous studies, and do not reflect priority of importance or sequencing.
Problem Tree for Rail-based Urban Transport in Mumbai

Effects

- Congested roads
- Undefined development corridors and urban sprawl
- Hampered connectivity for business and employment
- Poor quality of urban environment

Inadequate, congested, slow, and unsafe rail-based transport in Mumbai

Causes

- Extreme congestion in rail transport systems, affecting efficiency and safety, and lack of gender-specific features
  - Overstressed suburban rail system
  - Overstressed bus system
- Constrained right-of-way for at-grade development of rail systems
- Inadequate coverage of rail transport in Mumbai
  - Inadequate coverage of rail transport in Mumbai
  - Poor interconnection between primary transport axes on central and western lines
- Low investments in rail transport infrastructure
- Poor rail connectivity in new development areas
- Lack of alternate public transport modes infrastructure

Causes