

SECTOR ASSESSMENT (SUMMARY): TRANSPORT (RAIL TRANSPORT [NONURBAN])

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. The high rate of economic growth in the People's Republic of China (PRC) has strained the existing transport capacity for freight and passengers. The Government of the PRC has accelerated the development of different modes of transport to increase transport capacity, with rail development at the forefront of this accelerated growth. In the PRC, railways remain the preferred mode of medium- to long-distance intercity transport. Combined with economic growth and technological improvements, rail transport is sure to play a continuing role in the future.¹ The railways' competitive advantages are in the transport of bulk and semi-bulk commodities over medium to long distances, long-distance passenger transport, and containerized freight.

2. **Railway organization in the People's Republic of China.** There are two railway bodies in the PRC: the National Railway Administration and China Railway Corporation (CRC). These were created after the reorganization of the Ministry of Railways in 2013. The National Railway Administration, as a subsidiary body under the Ministry of Transport, is responsible for the technical standards and the oversight of the transport service. CRC, a state-owned enterprise under the Ministry of Finance, is responsible for the operation, maintenance, construction, and safety of the national railway system. The Government of the PRC, through CRC, administers the state-owned national railway. The entire network of PRC railways is managed and maintained by 18 railway bureaus. These railway bureaus are wholly owned and controlled by CRC.

3. **Network capacity.** During 2000–2016, the (conventional) railway network expanded by 55%, from 66,000 kilometers (km) to 102,000 km. In addition, the PRC has 22,980 km of high-speed railway lines. 68,073 km (55%) of the network is double-track and 80,000 km is electrified. Although the railway network is rapidly expanding in the PRC, railway density is still low at 12.92 km per 1,000 square km compared to developed countries like France, Germany, Luxembourg, and the Netherlands (all above 100 km per 1,000 square km on average).²

4. This massive railway network expansion has provided the needed transport capacity to move people and goods. Railway passenger movement in 2016 was 1.26 trillion passenger-km, which increased by 162% from 2003. Around 3.3 billion tons of freight was moved in 2016, up by 48% from 2003.³

5. Despite this impressive increase in railway network expansion and usage, the railway network remains insufficiently developed in some areas. Railway transport capacity is still inadequate along western PRC trunk routes, where the infrastructure is quite limited and unable to cope with the growth in traffic. The railway network has been operating close to or at capacity for many years in these areas. Special attention needs to be paid to this region, which the Thirteenth Five-Year Plan, 2016–2020 recognized as a priority.⁴

¹ Asian Development Bank (ADB). 2017. *Technical Assistance to the People's Republic of China for Supporting Project Preparation*. Manila.

² Eurostat. Statistics Explained. [Inland transport infrastructure at regional level](#).

³ National Bureau of Statistics. 2017. *China Statistical Yearbook, 2017*. Beijing.

⁴ Government of the PRC, National Development and Reform Commission. 2016. *Outline of the Thirteenth Five-Year Plan for National Economic and Social Development of the People's Republic of China, 2016–2020*. Beijing (adopted in 2016).

6. Railway development has lagged in the southwestern region because of the highly mountainous terrain, which makes railway construction difficult. The existing line connecting Yunnan province's capital city (Kunming) and Sichuan province's capital city (Chengdu) was constructed in 1970, is a single-track line with operating speeds of 40–60 km per hour, and has been operating at near full capacity for more than 10 years. To expand capacity across the southwestern region, new railway lines are being developed such as the Chengdu–Kunming and the Yuxi–Mohan railway lines. These railway lines will improve competitiveness of local products, enhance tourism development, support urbanization, and boost regional integration.

7. **Need for integrated and energy-efficient multimodal hubs.** With increased railway passenger movement, it is important to provide comfort, convenience and seamless connectivity to rail passengers. Efficient and modern railway hubs can improve passenger travel comfort and provide better accessibility, and connectivity. Some of the current railway stations in the PRC have inadequate connectivity to other modes, which limits passenger mobility. There is often congestion inside railway stations, which makes movement of passengers difficult. Poor and inadequate design of railway stations often leads to passenger mobility problems within stations.

8. A well-designed railway station can significantly enhance the overall journey experience for passengers. The design of new railway hubs should incorporate characteristics that (i) promote efficient operational management, (ii) make them effective focal points of multimodal integration, (iii) make them catalysts for urban development, and (iv) create an attractive user experience.⁵ Moreover, the 13th five year plan of the PRC strongly encourages the development of comprehensive passenger railway hubs.

9. **Need for railway maintenance and training.** An essential ingredient in the successful running of a railway is a well-maintained system. Maintenance costs are about 30% of the life cycle cost of both high-speed and conventional trains.⁶ Proper maintenance equipment and training for railway personnel are necessary to sustain the efficiency of the railway network. Modern, energy-efficient, and mechanized equipment can greatly improve and speed up maintenance activities.

10. Railways in the PRC employed about 1.87 million workers in 2016, but because of rapid development in rail technology and the system's high usage, manual maintenance of railway tracks and systems may not be able to cope with the rapid technological changes. Railway employees need to be updated and trained in new equipment and systems for efficiency and good quality maintenance work.

11. Railway lines through mountainous terrain pose challenges for conventional maintenance systems. With steep slopes, rugged terrain, and dangerous curves, railway maintenance in these areas is arduous and requires careful monitoring. Inspection and monitoring of railway systems in this type of complex terrain require highly mechanized and state-of-the-art equipment; this equipment is often not available in railway bureaus in the southwestern region of the PRC. Also, the capacity of the maintenance staff is limited, and maintenance teams of the railway bureaus often struggle to catch up with the rapidly growing network, which is increasingly difficult to maintain because of the surge in operating speeds.

⁵ ADB. 2015. *Improving Interchanges: Introducing Best Practices on Multimodal Interchange Hub Development in the People's Republic of China*. Manila.

⁶ The Railway Technical Website. [Train Maintenance](#).

2. Government's Sector Strategy

12. **Thirteenth Five-Year Plan.** The plan marks the PRC's move toward a moderately prosperous society (footnote 4). One of its aims is to develop smart, integrated, and eco-friendly transportation networks that connect domestic and international transportation routes; incorporate hubs with optimized functions; and provide integrated, efficient transport services. Some of the key features of the plan are to (i) speed up the construction of railways in the central and western regions, enhance the capacity of interregional railway transportation, and extend the network coverage; (ii) build the international transport corridor along the One Belt and One Road corridor; and (iii) enhance service level integration for integrated passenger transport hub stations.

13. **Western Development Strategy.** This strategy aims to develop the railway network in the western PRC. The region has a relatively limited transport network and is currently underserved by railways, which has constrained overall development. The railway network development strategy in the western PRC will directly improve links with the Greater Mekong Subregion, specifically the Lao People's Democratic Republic, Myanmar, and Viet Nam. In addition to direct links, the regional railway network development will increase access to eastern ports (and their connections to the Greater Mekong Subregion and the rest of the world) and provide opportunities that facilitate greater economic integration with the PRC's dynamic eastern seaboard and the national economy.

14. **Medium- and Long-Term Railway Network Plan, 2016–2030.** In 2016, the government developed this railway network plan to reduce transport inefficiencies and eliminate bottlenecks that constrain efficient economic development.⁷ Under the plan, the railway network will have reached 150,000 km by 2020, including 30,000 km of high-speed railway, linking 80% of the major cities. By 2025, the government aims to further expand the railway network to 175,000 km, including 38,000 km of high-speed railway, with broader coverage and an optimized network structure. By 2030, the government envisions a rail network reaching 200,000 km, of which 45,000 km will be high-speed rail. The government's vision is to develop a rail network that will have well-established internal and external connections, multi-routes for interregional connections, high-speed links between provincial capitals, express lines connecting prefectures and municipalities, and railway connectivity extending to county levels. The high-speed rail network will cover major cities (i.e., cities with a population of over 500,000) nationwide.

15. The medium- and long-term railway network plan places great importance on energy efficiency and environmental sustainability, which are also key priorities in the Thirteenth Five-Year Plan. It requires (i) strict compliance with energy-saving and environmental regulations and the achievement of preset goals, (ii) upgrading of technology and equipment for railway operation, (iii) more effective management of energy efficiency and emission reduction measures, (iv) improvement of staff's professional knowledge and technical skills, and (v) encouragement to embrace new energy and renewable energy.

3. ADB Sector Experience and Assistance Program

16. **Assistance to the railway industry.** The Asian Development Bank (ADB) has been a main development partner of the PRC and has focused on improving infrastructure in less developed and poor regions to promote sustainable economic growth and reduce poverty. ADB has provided 23 loans totaling \$4.67 billion for rail transport in the PRC, including five tranches

⁷ Government of the PRC. 2016. *Medium- and Long-Term Railway Network Plan*. Beijing (adopted in 2016).

under the Railway Energy Efficiency and Safety Enhancement Investment Program.⁸ These projects have introduced modern technology and improved the efficiency of railway operations through institutional and structural reforms. As of 2018, 20 projects had been completed (loans totaling \$4.13 billion), and 3 were under implementation. ADB has also provided 20 technical assistance projects totaling about \$9.44 million to: (i) promote the commercial operation of railways, (ii) establish corporate governance, (iii) achieve cost recovery, (iv) improve competitiveness and operational efficiency, and (v) enhance the railway industry's energy efficiency.

17. **Strategy and priorities.** Under the country partnership strategy for the PRC, 2016–2020, ADB will promote inclusive growth and environmental sustainability by helping to develop a more efficient, safe, green, and sustainable transport system.⁹ ADB will support (i) low-carbon transport modes such as inland waterway transport (IWT) and railways; (ii) public transport and nonmotorized transport systems in urban areas; (iii) road safety; (iv) multimodal passenger transport hubs; (v) freight logistics facilities; (vi) energy-efficient technologies, emissions control, and monitoring; and (vii) climate change adaptation. ADB will continue to promote synergies with the government's strategic programs and integrate crosscutting initiatives, including knowledge solutions. The country partnership strategy supports the development of efficient and integrated transport networks to meet the needs of a growing market economy and to contribute to reducing poverty through investment targeting poorer areas, coupled with policy and institutional reforms. Because of the importance of railway transport for the development of the national economy, ADB will continue to support railway development in the PRC by providing assistance on intercity rail network projects, developing intermodal links, and encouraging public–private partnership schemes for railway financing.

18. **Poverty reduction.** To increase the poverty reduction impact of transport investments, ADB pays particular attention to four issues: (i) locating ADB-financed projects in less developed regions where new lines will stimulate economic development, (ii) encouraging the maximization of employment for poor people during project construction and operation, (iii) supplying local materials that meet the requirements of quality and economy from poor villages, and (iv) providing station access roads and link roads to widen the reach of project benefits to poor interior areas.

19. **Regional cooperation.** The PRC is an active participant in two regional cooperation initiatives: (i) the Greater Mekong Subregion, through Yunnan and Guangxi provinces; and (ii) the Central Asia Regional Economic Cooperation Program, through the Xinjiang Uygur Autonomous Region and the Inner Mongolia Autonomous Region. The improvement of cross-border trade regimes is a common feature of these initiatives. And since these initiatives involve poorer areas of the PRC, expanding regional markets and options could help reduce poverty.

⁸ ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranchise Financing Facility and Technical Assistance Grant to the People's Republic of China for the Railway Energy Efficiency and Safety Enhancement Investment Program*. Manila.

⁹ ADB. 2016. *Country Partnership Strategy: People's Republic of China, 2016–2020—Transforming Partnership: People's Republic of China and Asian Development Bank, 2016–2020*. Manila.

Problem Tree for Transport (Rail Transport [Nonurban])

