

**The Asian Development Bank  
and the  
People's Republic of China:  
Partnership  
in the  
Railway Sector**

### **ADB's Experience in PRC's Railways**

ADB's experience with PRC railways shows that the construction of railways can stimulate economic growth in relatively poor areas. These projects, together with the developments and activities induced by the reduced cost of transport, have contributed to economic growth and transformations of local economies, enhanced the investment environment in the project areas, enabled access to markets and better prices for local products, improved labor mobility, and generated employment opportunities for local people. These projects helped to improve the incomes and living standards of people in general and to reduce poverty.

### **Recent Developments**

Railways are one of the primary modes of transport in the PRC. In 2003, road traffic accounted for 55.7% of total passenger-km followed by railways with 34.7%, civil aviation with 9.1%, and coastal and inland waterways with 0.5%. The modal split for freight ton-km was 53.3% for coastal and inland waterways, 32% for railways, 13.2% for roads, 1.4% for pipelines, and 0.1% for civil aviation.

The PRC railway system is the third largest in the world after the United States and Russia, at 73,000 route-kilometer (km). Regional Railway Administrations Bureaus (RABs) under the Ministry of Railways (MOR)<sup>1</sup> operate and manage 60,446 route-km. The remaining about 12,554 route-km have been developed and operated as local railways<sup>2</sup>. The PRC railway system carried 1,725 billion ton-km and 479 billion passenger-km during 2003. Railway freight transport density is the highest in the world and passenger transport density ranks second after Japan. Locomotive turnover is the highest in the world. In contrast to the high transport density, network density is among the lowest in the world. Given the location of the population, natural resources, and location of industries in the PRC, the current size of the railway network does not provide adequate coverage.<sup>3</sup> There are vast inland areas in the central and western parts of the country that do not have any rail transport. The underdeveloped railway network is insufficient to meet the increasing demand for transportation services and hinders economic growth. This is particularly evident in the transport of coal that accounts for over 40% of total rail freight traffic. Transport bottlenecks related to the delivery of coal were one of the factors contributing to the emerging power shortages in 2003-2004.

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<sup>1</sup> MOR is the regulator under the Railway Law as well as a transport operator. By the end of 2004, MOR has 2 million employees, of whom 1.43 million are involved in the rail transport enterprises. The 14 RABs are state-owned transport enterprises are further divided into 41 sub-administration bureaus (SABs).

<sup>2</sup> Local railways consisted of the lines owned by provincial governments and 29 joint ventures between MOR and the provincial government, and other stakeholders.

<sup>3</sup> Railway network density in terms of route-km per square km of land area is one third that of India and one tenth that of Japan.

Railway freight traffic grew at 4.8% annually during 1978-2003. Both the hauling distance and cargo volume increased steadily. There is a geographical imbalance in resources (in the center and west) and consumption (along the east coast) in the PRC. The railway provides cost-efficient, long-haul transportation for bulk commodities (e.g., coal, petroleum, timber, steel, mineral ore) from the interior regions to the east coast. A good rail network is needed to spread the economic prosperity of the east toward the west.

Rail passenger traffic in passenger-km grew at 6.1% annually during 1978-2003. Nearly 90% of passenger transport in the PRC was carried by roads and railways. The average journey per passenger on roads grew from 35 km in 1978 to 53 km in 2003, while the average railway journey increased from 134 km to 492 km over the same period. The railway has a competitive advantage for longer-distance passenger trips. High-speed passenger services are being introduced to serve this market.

### **Increased Investment and Railway Reforms**

In the 1990s, inadequate investment was identified as the primary cause of insufficient transport capacity in the rail sector. During the Ninth Five-Year Plan (1996-2000), Government investment nearly tripled in real terms over the previous period. A total of CNY250 billion was invested to construct 5,600 route-km, electrify 4,300 km, and double-track 4,270 km. During the Tenth Five-Year Plan (2001-2005) railway investment was further increased to CNY350 billion to build 6,000 route-km, electrify 5,000 km, and double-track 3,000 km railways.

Railway sector reforms began in the early 1980s to improve efficiency and effectiveness in the provision of railway services. As a new management concept, the Asset Operating Liability System (AOLS) was introduced as a pilot project in 1999. Under this system MOR provided RABs with incentives to improve operating performance and profitability. Separating core and non-core businesses was identified as a key milestone. The total number of employees in core transportation business was reduced from 1.89 million (1997) to 1.48 million (2002). Five companies employing 616,500 staff were divested in non-core transportation businesses. To provide jobs for redundant staff, MOR set up diversified businesses to supply equipment, goods, and services to the railway industry. By the end of 2002, 7,681 such companies, employing over 400,000 staff, had been established. In 1998, a cost-sharing scheme was introduced for health insurance and pensions. Since 2000, 225 railway primary and middle schools, 13 hospitals, and 10 universities have been transferred to the local governments. A total of 120 branch lines comprising 7,800 km of the route length are being restructured.

Measures have been taken to improve MOR's operational and management information system (MIS), including developing the transportation MIS and introducing a computerized ticketing system in 700 stations that account for 95% of passenger traffic. MOR will introduce a train dispatch MIS in all RABs and 70 major trunk lines and adopt centralized traffic control on several trunk lines. Rail container transport has grown three times faster than ordinary freight traffic. To service this growing market, MOR established in 2003 three freight corporations, which

specialize in container, over-sized freight and parcel transport respectively. MOR will build 18 large container terminals by 2007.

Though the National Development and Reform Commission (NDRC) regulates tariff changes, MOR has flexibility to levy charges and set tariffs within a defined range. In 1991, a purpose-specific freight surcharge was introduced to finance capital expenditures and debt servicing. In 1993, the Government approved the policy of “new line, new tariff” under the cost recovery policy. A separate charge on the electrified track was adopted. In 1999, additional charges for freight loading and unloading were introduced. On the passenger side, MOR offers a utility-based tariff differentiation for value-added services such as higher-class passenger services, air-conditioning, sleepers, and express train services. MOR has the flexibility to charge 20–30% higher fares during peak holiday seasons. In spite of the tariff increases, the current tariffs for freight and passenger transport are still low compared with other transport modes in the PRC and by world standards.

### **Government’s Plan for Railway Development**

The Government’s Railway Development Plan for 1998-2004 gives priority to un-served areas, particularly railway lines that would improve links between the poor inland provinces in the western and central PRC and the more prosperous coastal areas. The plan is focused on (i) expanding rail network and removing constraints to national economic development; (ii) encouraging construction of joint venture railways to develop local economies; (iii) improving the efficiency of the existing system by using new technology and modern management tools; (iv) reducing subsidies for infrastructure through appropriate pricing and commercializing services to increase cost recovery and reliance on user-funded investment; (v) implementing institutional and structural reforms to provide autonomy to railway entities by matching responsibility with accountability, and (vi) encouraging non-government investment in infrastructure and related services.

The 2003–2007 railway development plan aims to achieve a larger, faster, and safer rail transportation system; upgrade technology; improve the quality of service; and deepen reforms to enhance management systems, reduce staff, improve productivity, corporatize central railway services, and open them to diversified ownership. Annual rail investment during 2003–2007 will double from CNY50 billion to CNY100 billion.

In 2004 the State Council approved in principle the country’s medium- and long-term plan of railway construction. Under the plan, railways in operation will increase from 72,000 kilometers to 100,000 kilometers by 2020, the ratio of double-track railways and electrified lines will both reach 50%, and the major railway technology and equipment will reach or near the international advanced level. The plan also calls for separate lines for cargo and passenger transportation on busy trunk lines. About 12,000 kms of passenger-dedicated lines will be built before 2020, along with express passenger transport systems planned in the Bohai Sea ring, the Yangtze River delta and the Pearl River delta. Connections with western regions will be strengthened by building 16,000 kms of railways by 2020 to link the southwestern and northwestern border areas. To meet the demand for the large-scale railway construction, MOR is exploring more channels to raise funds, including allowing domestic and foreign investors to be involved in the construction of trunk passenger lines and inter-city lines.

In view of the capacity shortages that became more severe in 2003-2004, MOR has identified measures to maximize the capacity of existing infrastructure and facilities by: (i) rationalizing the training scheduling and route planning; (ii) separating passenger from freight transport on several trunk lines; (iii) improving freight wagon utilization; (iv) scheduling heavy haul freight trains and non-stop express freight trains; (v) modernizing rolling stock fleet, including coaches, to allow a speed of 200km/hour, and heavy-haul wagons, double-level flat wagons for containers; and (vi) developing management information systems for administration and transport operation.

### **ADB's Strategy to Assist PRC's Railway Sector**

Recognizing the importance of railways in providing cost-effective transportation for large volumes of goods and people over long distances, and that railway is the most energy efficient and environment friendly mode of transport, ADB's railway sector strategy focuses on (i) expanding the railway system by constructing new lines, particularly in the poorer areas of inland provinces; (ii) modernizing and increasing the capacity on key routes of the national railway system; (iii) commercializing railway operation; and (iv) increasing the railway's competitiveness in the transport sector by restructuring and policy reforms. Because poverty reduction is ADB's main goal, preference is given to projects located in poorer parts of the country and those that connect relatively poor areas to the economic mainstream. The goal is to reduce the cost of transport to and from poor areas and between growth centers, and increase access of the poor to employment, markets, education, and health care.

### **How ADB Tackles Poverty through Railway Projects**

ADB has focused on railway development in less-developed inland provinces to promote economic growth and reduce poverty. Since 1989 ADB has provided 12 loans totaling about \$2.2 billion to finance the construction of 1,921 km of new railway lines under eight local railway projects and 4,138 km under four national railway projects. These projects have financed the construction of important provincial and national railway lines in unserved and less-developed areas; many of the areas have higher poverty incidences than national average.

Identifying ways to enhance poverty reduction impact has been an integral part of project planning and design. Specific features to enhance project benefits for the poor include: (i) providing employment during construction and operation of project railways on a preferential basis to poor workers; (ii) railway stations are located in poor areas, including poverty counties; (iii) projects are supported by associated facilities such as access and link roads connecting railway stations so that benefits are spread in the poor hinterland; (iv) encouraging the use of locally produced materials that meet the requirements of quality and economy; (v) including provisions for railway station area development; and (vi) encouraging the use of poverty reduction programs of local governments to complement the poverty reduction efforts of railway projects.

Analysis of completed ADB-financed railway projects found that improved transportation results in the growth of industry that increases employment opportunities. The shift in employment from agriculture to agro processing, light industry, and services increases job opportunities for women whose incomes and social status then improve. The tourism industry also develops rapidly after transport constraints are removed. After the project

completion, per capita GDP in the project area usually grows faster than in the concerned province. In short, ADB railway projects help to raise living standards and reduce poverty.

### **ADB's Policy Partnership with the PRC**

ADB is supporting the transformation of the railway sector to provide efficient, safe, and quality transport services; maintain financial self-sufficiency; and enhance sub-regional cooperation with central and south-east Asia. Policy dialogue has been a significant component of ADB assistance to the railway sector and has complemented the lending operations.

*Sector Reforms.* ADB is supporting institutional reform of the PRC railway sector to separate the Government's function and the enterprise function, giving full play to market forces and increasing the competitiveness of the railways. Separation of core transport business from non-core transport business, segmentation of passenger and freight services, and strengthening of corporatized specialized transportation companies will be actively pursued through ADB projects. As part of ADB's policy dialogue with MOR, three large companies handling containers, special goods, and express parcels are being established. Rationalization of staff and reduction of transportation and non-transportation staff numbers will also be pursued. ADB will continue supporting operational reforms, including emphasis on safety and the introduction of safe and reliable technology, upgrading speeds, introduction of dedicated passenger and freight lines, modern dispatch control systems, and high-quality information systems on the railway network. The PRC's accession to the World Trade Organization (WTO) in December 2001 has intensified competition among different transport modes and the structure of transport demand may change. ADB has provided an advisory TA for policy reform related to WTO accession.

*Marketing and Business Development.* As the PRC progresses to a market economy, the railways will need to compete on the basis of price and service quality to provide transportation services to an increasingly diversified and discriminating market. New marketing and business development initiatives are needed both for freight and passenger services to be competitive. ADB has supported project-specific studies to create marketing and business development opportunities, including skills and knowledge for market-oriented operation, and to create awareness of profitable operations.

*Private Sector Participation.* ADB's policy dialogue has been designed to encourage the participation of the private sector in the railway sector in the provision of services, construction, tourism, container, and parcel related businesses. MOR will encourage the development of industrial sidings, station facilities, local tourism, and real estate. Activities such as track maintenance, maintenance of electric power cables, loading/unloading, and other logistics facilities will be outsourced. All of these actions will enhance opportunities for private sector participation.

## **Who Benefits from ADB Railway Projects?**

Construction and operation of railways accelerate economic growth by lowering transport costs that, in turn, leads to the development of new industries, exploitation of natural and agricultural resources, and development of associated businesses, services and commerce. The resulting increased income and employment opportunities improve living standards and decrease the number of people living below the poverty line. ADB-financed railway projects, together with the planned access and link roads to the hinterland, improve transport access for the rural population to markets and social services and help develop industry, natural resources, and agro processing by creating new employment and income-generating opportunities that benefit people in general, and the poor in particular.

## **External Assistance**

Raising foreign capital and diversifying financing sources are part of MOR's reform agenda. The national railway assets have been financed by Government funds (67%), railway construction bonds (3%), domestic banks (21%), the Japan Bank for International Cooperation (5.4%), the World Bank (WB) (2.4%), the Asian Development Bank (ADB) (1.0%), and export credit agencies (0.4%). Export credit agencies from Europe and North America began providing financing in 1995. Modern technology, rolling stock, environmental protection facilities, and signaling and communications equipment are procured using commercial-based financing.

## **Lessons Learned**

Experience from completed and ongoing ADB-financed railway projects shows strong commitment and generally satisfactory capabilities of the executing agencies for project implementation. The speed of implementation has often exceeded the expectations at the time of appraisal. Loan covenants are generally complied with and resettlement and environmental management are generally carried out satisfactorily. Audited financial statements were submitted in a timely manner, and the audited financial statements were generally of acceptable quality. The key lessons from the railway projects highlight the need to: (i) ensure that the executing agency is established during project processing and is also responsible for project implementation and operations; (ii) prepare realistic traffic forecasts; (iii) review constraints to traffic on a network basis, and the impact on project viability of existing and/or planned railway lines and other transportation modes that may compete with the project facilities; and (iv) finance railway projects using appropriate debt-equity ratios.

## What railway projects has ADB supported in the PRC?

No.	Loan	Project	Length (km)	Administrative Area	Amount (\$ million)	Approval Date
1	948	Shanxi-Xiaoliu Railway	44	Shanxi	39.70	31-Jan-89
2	1087	Yaogu-Maoming Railway	232	Guangdong	67.50	20-Jun-91
3	1167	Guang-Mei-Shan Railway	480	Guangdong	200.00	25-Jun-92
4	1221	Hefei-Jiujiang Railway	335	Auihui and Hubei	110.00	30-Mar-93
5	1305	Jing-Jiu Railway Technical Enhancement	2,530	Beijing, Tianjin, Hebei, Henan, Shandong, Anhui, Hubei, Jiangxi, and Guangdong	200.00	14-Jul-94
6	1439	Daxian-Wanxian Railway	156	Sichuan and Chongqing	100.00	4-Jun-96
7	1553	Shenmu-Yanan Railway	386	Shaanxi	200.00	29-Sep-97
8	1626	Guizhou-Shuibai Railway	121	Guizhou	140.00	18-Aug-98
9	1748	Hefei-Xi'an Railway	954	Shaanxi, Anhui	300.00	17-Aug-00
10	1850	Ganzhou-Longyan Railway	277	Jiangxi and Fujian	200.00	30-Oct-01
11	2051	Yichang-wanzhou Railway	377	Chongqing and Hubei	500.00	15-Dec-03
12	2116	Dali-Lijiang Railway	167	Yunnan	180.00	04-Dec-04
		<b>Total</b>	<b>6,059</b>		<b>2,237.20</b>	

No.	TA	Advisory TA Assistance	Amount (\$)	Approval Date
1	1117	Developing the Institutional Capability of the Joint Railway	450,000	31-Jan-89
2	1523	Institutional Strengthening of the GSRC	965,000	20-Jun-91
3	1524	Regional Railway Sector Study	275,000	20-Jun-91
4	1720	Institutional Strengthening of Guangdong Guang-Mei-Shan Railway	250,000	25-Jun-92
5	1721	Institutional Strengthening of Guangdong Planning Commission	250,000	25-Jun-92
6	1861	Strengthening Business and Commercial Practices of the Hefei-Jiujiang Railway	600,000	30-Mar-93
7	2122	Policy Support to the Ministry of Railways	600,000	14-Jul-94
8	2578	Institutional Strengthening of Local Railways in Sichuan	400,000	4-Jun-96
9	2878	Institutional Strengthening of Local Railways in Shaanxi Province	400,000	29-Sep-97
10	4255	Ensuring Safeguard Practices	150,000	15-Dec-03
11	4325	WTO-Policy Reform Support to the Ministry of Railways	400,000	02-April-04
		<b>Total</b>	<b>4,740,000</b>	

TA=technical assistance

## What are ADB's plans for future railway investment?

Over the three years of 2005-2007, ADB plans to provide \$950 million for 3 railway projects and about \$1.4 million grants for railway technical assistance. These projects will be designed to combat poverty in the PRC's western areas.

<b>No.</b>	<b>Loan Proposal</b>	<b>Amount (\$ million)</b>	<b>Expected Approval Year</b>
1	Xi'an-Zhengzhou Passenger Railway	400	2005
2	Zhongwei-Taiyuan (Ningxia-Shanxi) Railway	250	2006
3	Railway Development Project	300	2007
	<b>Total</b>	<b>950</b>	

<b>No.</b>	<b>TA Proposal</b>	<b>Amount (\$)</b>	<b>Expected Approval Year</b>
1	Taiyuan-Zhongwei (Shanxi-Ningxia) Railway	500,000	2005
2	Railway Passenger and Freight Policy Reform	400,000	2005
3	Railway Development I	500,000	2006
	<b>Total</b>	<b>1,400,000</b>	

## Railway Sector Roadmap

Item	Indicators				
	5 years ago	Current	5 years later		
<b>A. Sector Outcomes</b> Service of the poor areas Increasing capacity in key routes	Low Moderate	Low Moderate	Improved Improved		
<b>B. Sector Outputs</b> Expanded railway network (km) Higher rail density (km/100 km <sup>2</sup> ) Improved railroad conditions Increased traffic volume Freight (billion ton-km) Passenger (billion passenger-km) Proportion of high-speed network (%)	56,007    1292 332	73,000   1725 479	77,000     18.7		
<b>C. SECTOR ISSUES AND CONSTRAINTS</b>	<ul style="list-style-type: none"> <li>• Inadequate rail network, particularly in un-served and poor areas</li> <li>• Modernization and increasing capacity and remove bottlenecks</li> <li>• Commercializing of railway operations to sustain efficient operations</li> <li>• Weak corporate governance of local railways</li> <li>• Low level of private sector participation</li> <li>• Promoting regional cooperation with Greater Mekong Sub-region, Central Asian Republics, and Mongolia</li> </ul>				
<b>D. Actions, Milestones, and Investments</b>			<b>By Agency</b>		
	<b>By Issue</b>	<b>Schedule</b>	<b>ADB</b>	<b>Others/ External</b>	<b>Govt</b>
	Eight South-North and East-West Railways		X	World Bank, JBIC	X
	High Speed Passenger Network (20,000 km)	2003–2010	X	World Bank, JBIC	X
	High Speed Freight Network (16,000 km)	2003–2020	X	World Bank, JBIC	X
	Accelerate Railway Construction in the West	2004–2020	X	World Bank, JBIC	X
	Investment needs: \$43 billion	2001–2005	X	World Bank, JBIC	X
Reforms and Restructuring	Ongoing	X	World Bank, JBIC	X	

JBIC = Japan Bank for International Cooperation.