

Ex-ante Evaluation

1. Name of the Project
Country: India Project: Delhi Mass Rapid Transport System Project Phase 2 (III) (Loan Agreement: March 10, 2008; Loan Amount: 72,100 million yen; Borrower: The President of India)
2. Necessity and Relevance of JBIC's Assistance
<p>In large cities like Delhi and Kolkata, traffic congestion accompanying the increase in road traffic demands has become a serious issue, accelerating economic loss and health hazards caused by atmospheric contamination, noise and other forms of vehicle-related pollution. Consequently, there is a need to develop a public transportation system for alleviating traffic congestion and improving the urban environment.</p> <p>In addition to meeting transport needs accompanying the economic growth of recent years, the 10th Five-Year Plan (April 2002–March 2007) by the Government of India proposes to develop a public transportation system from the perspective of safety, energy efficiency and environmental conservation.</p> <p>In the current administration's Common Minimum Programme, launched in May 2004, emphasis is placed on upgrading the urban transportation infrastructure, and the same emphasis is expected to be cited in the 11th Five-Year Plan (April 2007–March 2012).</p> <p>In JBIC's Medium-Term Strategy for Overseas Economic Cooperation Operations, priority areas for assistance to India are "Economic Infrastructure Development" and "Response to Environmental Issues." Thus the assistance provided by this project is therefore consistent with JBIC's strategy.</p> <p>The population of the Delhi metropolitan area increased from 6.2 million in 1981 to 16.3 million in 2006, and the accompanying surge in the number of buses and private vehicles has reduced the average vehicle speed to 15 km/h in the city, resulting in serious traffic congestion. Given the difficulty in significantly expanding the road network and the capacity of existing public transportation (buses and railroads), a major component of the Delhi government's urban transportation policy and measures for urban environmental problems is extension of the rapid transport system being constructed in Phase 1 (JBIC's previous loan, "Delhi Mass Rapid Transport System Project"), to ease congestion and take measures against automobile pollution. Thus JBIC's support for this project is highly necessary and relevant.</p>
3. Project Objectives
The objective of this project is to cope with the surge in traffic demand in the Delhi metropolitan area, the capital city of India, by extending the mass rapid transportation system with a total length of approximately 83 km, and thereby promoting regional economic development and improving urban environment, through mitigation of traffic jams and decrease of pollution caused by the increasing number of motor vehicles.
4. Project Description

(1) Target Area

National Capital Territory of Delhi

(2) Project Outline

This is a project to install the 7 segments (total length: approximately 83km) of 6 lines listed below, as Phase 2 of the urban rapid transport system plan in Delhi (total length: approximately 414 km)

(a) Civil works

Line #1: Shahdara – Dilshad Garden (3.09 km)

Line #2: Central Secretariat – Haryana state border (20.50 km, of which 11.76 km is underground)
Vishwa Vidyalaya – Jahangir Puri (6.36 km, of which 0.94 km is underground)

Line #3: Indraprastha – New Ashok Nagar (8.07 km)

Line #4: Yamuna Bank – Anand Vihar (6.16 km)

Line #5: Kirti Nagar – Mundka, Ashok Park – Inderlok (18.47 km)

Line #6: Central Secretariat – Badarpur (20.04 km, of which 6.1 km is underground)

Construction of an at-grade station (1 station), elevated stations (49 stations), and underground stations (14 stations)

(b) Electrical, signaling, and telecommunication system

(c) Procurement of rolling stocks

(d) Construction of depots

(e) Consulting services (aid in bidding procedure, construction monitoring and supervision, quality control, safety control, etc.)

The yen loan portion applies to civil works for the underground portions including subway stations, track sections along the entire line, etc.; electrical and telecommunication system for all lines; rolling stock procurement; and consulting services.

(3) Total Project Cost/Loan Amount

423,282 million yen (Yen Loan Amount: 210,059 million yen)

(4) Schedule

January 2006–December 2010 (60 months). Project completion is defined as when consulting services are completed.

(5) Implementation Structure

(a) Borrower: The President of India

(b) Executing Agency: Delhi Metro Rail Corporation Limited (DMRC)

(c) Operation and Maintenance System: Same as (b)

(6) Environmental and Social Consideration

(a) Environmental Effects/Land Acquisition and Resident Relocation

(i) Category: A

(ii) Reason for Categorization

This project falls into the railroad sector project which is likely to have significant adverse

impact on the environment under the “Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations” (established in April 2002). Thus this project is classified as Category A.

(iii) Environmental Permit

The Environment Impact Assessment (EIA) report for this project has been prepared in August 2005, though it is not required for the project in the country’s legal system (for some of the lines, in May 2007).

(iv) Anti-Pollution Measures

With regard to noise pollution, noise reduction measures including soundproof walls and sound insulating pads will be adopted.

(v) Natural Environment

The project’s site is located in an urban area, and the planned route generally runs along existing roads, so it is likely to have minimum adverse impact on the natural environment.

(vi) Social Environment

This project requires land acquisition of 181.58 ha. A total of 1,655 residences and buildings are expected to be relocated, with December 2008 as the target date for its completion. Since discussions have already been held with those being targeted for land acquisition and relocation, steps are now being taken for resident relocation pursuant to the Land Acquisition Law and the resident relocation plan prepared by the Government of National Capital Territory of Delhi (GNCTD).

(vii) Other/ Monitoring

The executing agency will monitor noise, vibration, air quality, water quality, land acquisition, resident relocation, etc.

(b) Promotion of Poverty Reduction

None

(c) Promotion of Social Development (e.g. Gender Perspective, Measures to Prevent Infectious Diseases Including AIDS, Participatory Development, Consideration for the Handicapped, etc.)

Many of the migrant workers employed by this project live alone, and their risk of HIV infection is considered high. For this reason, the executing agency, in cooperation with local NGOs, is planning to implement HIV prevention activities as a form of social contribution. In addition, the station houses and coaches will be built by taking into consideration the needs of the elderly and the disabled (e.g., in the design of elevators and restrooms and the provision of in-train announcements, signs in Braille and space for wheelchairs). At the same time, the executing agency plans to offer training in customer care for all front line staff including station attendants and crew members.

(7) Other Important Issues

None

5. Outcome Targets

(1) Evaluation Indicators (Operation and Effect Indicator)

Indicator	Target (2012, 2 years after completion)
Operating rate (%/year)	92
Running distance (1000 km/day)	103.01
Line#1 (Shahdara – Dilshad Garden)	2.82
Line#2 (Central Secretariat – Haryana state border)	30.20
Line#2 (Vishwa Vidyalaya – Jahangir Puri)	5.80
Line#3 (Indraprastha – New Ashok Nagar)	6.78
Line#4 (Yamuna Bank – Anand Vihar)	3.94
Line#5 (Kirti Nagar – Mundka) (Ashok Park – Inderlok)	24.97
Line#6 (Central Secretariat – Badarpur)	28.5
Number of running trains (trains/day-1 direction)	1,110
Line#1 (Shahdara – Dilshad Garden)	114 (X=6)
Line#2 (Central Secretariat – Qutub Minar)	236 (X=3)
Line#2 (Qutub Minar – Haryana state border)	114 (X=6)
Line#2 (Vishwa Vidyalaya – Jahangir Puri)	114 (X=6)
Line#3 (Indraprastha – New Ashok Nagar)	105 (X=4)
Line#4 (Yamuna Bank – Anand Vihar)	80 (X=12)
Line#5 (Kirti Nagar – Mundka) (Ashok Park – Inderlok)	169 (X=4)
Line#6 (Central Secretariat – Badarpur)	178 (X=4)
Volume of transportation (million people-, km/day)	18.38
Passenger traffic receipts (million rupees/day)	23.00

(Running every X minutes at peak hours)

(2) Number of beneficiaries

13.85 million (Population of the Territory of Delhi in FY2001). The projected number of users of Delhi's Rapid Transport System per day in 2012, which is the basis for the freight receipts in the operation and effect indicators, is 2.67 million people.

(3) Internal Rate of Return (Financial and Economic Internal Rate of Return)

Based on the conditions indicated below, the economic internal rate of return (EIRR) of this project is 20.91%; the financial internal rate of return (FIRR) is 6.88%.

[EIRR]

(a) Cost: Project cost (excluding tax), operation and maintenance expenses

(b) Benefit: Cost savings on conventional transportation means and roads, reduction in travel time for users of these train lines and for users of other means of transportation, savings on the operation expenses of buses and other transit systems due to alleviation of road

<p>congestion, reduction in the number of accidents and pollution.</p> <p>(c) Project Life: 30 years</p> <p>[FIRR]</p> <p>(a) Cost: Project cost, operation and maintenance expenses</p> <p>(b) Benefit: Fare income, advertising revenue, real estate development income</p> <p>(c) Project Life: 30years</p>
<p>6. External Risk Factors</p>
<p>Economic slowdown and deterioration in India and in surrounding regions together with natural disasters</p>
<p>7. Lessons Learned from Findings of Similar Projects Undertaken in the Past</p>
<p>From the ex-post evaluations of previous railway and underground rail projects, it has been learned that establishment of a financially independent project implementation structure is important from the standpoint of ensuring proper operation and maintenance. Improving the utilization rate is essential to strengthening the finances, and in this project adjusting this project's routes so that they will not compete with bus routes is desirable for boosting the utilization rate. GNCTD is already making this adjustment, and an agreement has been made between DMRC and Delhi Transport Corporation that bus lines will play the role of feeder lines for this project. Moreover, to further improve the project's financial status, the executing agency is studying related businesses such as advertising and real estate development.</p>
<p>8. Plans for Future Evaluation</p>
<p>(1) Indicators for Future Evaluation</p> <p>(a) Operating rate (available vehicles/procured vehicles) (%/year)</p> <p>(b) Running distance (1000 km/day)</p> <p>(c) Number of running train (trains/day-one direction)</p> <p>(d) Volume of transportation (million people-km/day)</p> <p>(e) Passenger traffic receipts (million rupees/day)</p> <p>(f) Internal rate of return FIRR (%), EIRR (%)</p> <p>(2) Timing of Next Evaluation</p> <p>2 years after project completion</p>