

## Ex-Ante Evaluation (for Japanese ODA Loan)

### 1. Name of the Project

Country: India

Project: Chennai Metro Project (II)

Loan Agreement: March 31, 2010

Loan Amount: 59,851 million Yen

Borrower: The President of India

### 2. Background and Necessity of the Project

#### (1) Current State and Issues of the Urban Transport Sector in India

India is experiencing rapid urbanization. While the registered number of automobiles and motorcycles are surging (with annual average growth of 11% since 1997), the development of public transportation infrastructure is much lagging. As a result, traffic congestion due to the increased number of automobiles and motorcycles is becoming a serious problem in urban areas. Particularly, in metropolitan cities such as Delhi, Kolkata and Chennai, traffic congestion accompanying the rise in road traffic demand is becoming a critical issue. Since this is causing economic loss and health hazards due to air, noise and other forms of vehicle-related pollution, there is an urgent need to introduce a public transportation system to alleviate traffic congestion and vehicle-related pollution.

#### (2) Development Policies for the Urban Transport Sector in India and the Priority of the Project

In its Eleventh Five Year Plan (April 2007–March 2012), the Government of India has placed emphasis on development of urban transport sector to mitigate the issues mentioned above. In particular, the construction of mass transit systems is recommended for cities with a population of more than 4 million.

#### (3) Japan and JICA's Policy and Operations in the Urban Transport Sector

The “Promotion of Economic Growth” is one of the prioritized areas of Japan's Country Assistance Program for India by the Government of Japan. Accordingly, JICA has set the “Promotion of Sustainable Growth through the Development Assistance to the Infrastructure” as a prioritized area. The Project is categorized under the “Improvement of Transport Networks” program within the said priority area, therefore the assistance for the Project is consistent with Japan and JICA's policy. Regarding Japanese ODA Loans for India, 33 projects totaling 586,333 million Yen have been extended in the transport sector, comprising 17 projects totaling 513,338 million Yen in the urban transport sector. Concerning technical cooperation and grants, experts in the fields of rolling stock maintenance and safety management were dispatched in 2008 for the Delhi Mass Rapid Transport System Project.

#### (4) Other Donors' Activities

The World Bank has focused its assistance on increasing transport capacity through road infrastructure development and institutional reforms in the road sector, and subsequently the

approved loans in the transport sector amounts to 16,702 million USD (as of June 2009). The Asian Development Bank (ADB) is also engaged in infrastructure development such as national highways / state roads and capacity building & institutional reforms. The amount of approved loans in the transport sector is 7,464 million USD (as of December 2009).

#### (5) Necessity of the Project

The Chennai metropolitan area in the State of Tamil Nadu has the fourth largest population in India, and is the largest metropolitan area in southern India. Its population has increased rapidly from 4.50 million in 1981 to 7.06 million in 2001, and has now reached 7.60 million. With the population density of 24,000 people/km<sup>2</sup> (cf. 13,000 people/km<sup>2</sup> in Tokyo 23 wards), Chennai is one of the most overpopulated cities in the world. In line with the population increase, the number of registered vehicles has also increased dramatically, more than doubling from 1991 to 2001. As a result, the current average travel speed on major city roads is approximately 15 km/h, and traffic congestion is severe. On the other hand, since it is difficult to expand the transport capacity of existing public transportation (buses and trains) as well as the road network system, the development of a mass rapid transit system to ease the heavy traffic and reduce vehicle-related pollution has become the major countermeasure in the urban transportation and environmental policy of the Government of Tamil Nadu. Therefore, JICA's assistance for the Project is highly necessary and relevant.

### **3. Project Description**

#### (1) Project Objective(s)

The objective of the Project is to cope with the growing traffic demand in the Chennai metropolitan area in the State of Tamil Nadu, by developing the mass rapid transit system, thereby contributing to regional economic development and improvement of the urban environment through alleviation of traffic congestion and reduction of traffic pollution

#### (2) Project Site/Target Area

Chennai metropolitan area in the State of Tamil Nadu

#### (3) Project Component(s)

The Project aims to develop a mass rapid transit system with two lines totaling approximately 43 km in length in the Chennai metropolitan area. The portions of the Project covered by Japanese ODA Loans are as follows.

- 1) Civil work (24 km underground [including 20 subway stations], trackworks for all the line, etc.)
- 2) Electrical and Signaling & Telecommunication System
- 3) Procurement of Rolling Stocks
- 4) Consulting services (tender assistance, construction monitoring and supervision etc.)

#### (4) Estimated Project Cost (Loan Amount)

378,138 million Yen (Loan Amount: 59,851 million Yen)

#### (5) Schedule

November 2008 – March 2015 (77 months). Project completion is scheduled in March

2015 as metro train services become available along the entire line.

(6) Project Implementation Structure

- 1) Borrower: The President of India
- 2) Executing Agency: Chennai Metro Rail Limited (CMRL)
- 3) Operation and Maintenance System: same as 2) above

(7) Environmental and Social Consideration/Poverty Reduction/Social Development

1) Environmental and Social Consideration

- (i) Category: A
- (ii) Reason for Categorization: The Project falls under the category of a railroad sector project which is likely to have a significant adverse impact on the environment under the “Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Consideration” (Established in April 2002). Thus the Project is classified as Category A.
- (iii) Environmental Permit: The Environment Impact Assessment (EIA) report for this project was prepared in May 2008, although EIAs are not mandatory for such projects in India.
- (iv) Anti-Pollution Measures: With regard to noise pollution, noise reduction measures including soundproof walls and sound insulating pads are scheduled to be adopted.
- (v) Natural Environment: Because the project’s site is located in an urban area and the planned route generally runs along existing roads, it is likely to have minimum adverse impact on the natural environment.
- (vi) Social Environment: The Project requires land acquisition of 7.45 ha. A total of 531 households (502 for squatters) and 201 shops need to be resettled. CMRL are holding discussions with those affected by land acquisition and resettlement, The land acquisition, resettlement and compensation are scheduled to proceed pursuant to Land Acquisition Act and the resettlement action plan prepared by CMRL.
- (vii) Other / Monitoring: CMRL is monitoring noise, vibration, air quality, water quality, soil contamination, land acquisition, resettlement, etc. in the Project.

2) Promotion of Poverty Reduction

None

3) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases Including HIV/AIDS, Participatory Development, Consideration for the Person with Disability etc.):

Many of the migrant workers employed by the Project live alone, and the risk of HIV/AIDS infection is considered high. For this reason, HIV/AIDS prevention activities are scheduled to be implemented. In addition, the stations and coaches will be designed taking into consideration of needs of the elderly and the physically challenged (e.g. user-friendly design of elevators and restrooms, announcements at stations, signs in Braille, space for wheelchairs).

(8) Collaboration with Other Donors

None

(9) Other Important Issues

None

#### 4. Targeted Outcomes

(1) Performance Indicators (Operation and Effect Indicator)

Indicator	Target (2017) [Expected value 2 years after project completion]
Operating rate (%/year)	92
Running distance (1000km/day)	71.2
Number of running trains (number of trains/day, one direction)	409
Volume of transportation (million persons-km/day)	7.3
Income from Passengers (million rupees/day)	11.3

(2) Internal Rate of Return

Based on the conditions indicated below, the Economic Internal Rate of Return (EIRR) for the Project is 13.25%; the Financial Internal Rate of Return (FIRR) for the Project is 2.16%.

[EIRR]

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

Benefit: Savings of vehicle operating cost (fuel consumption) and maintenance cost, savings of the metro and road passenger travel time, savings on vehicle operating cost by alleviating congestion (time factor), savings from decrease of accidents, reduction of traffic pollution

Project Life: 30 years

[FIRR]

Cost: Project cost, operation and maintenance expenses

Benefit: Revenue from the metro passenger, advertisement and property

Project Life: 30 years

#### 5. External Factors and Risk Control

Changes in transport demand

#### 6. Lessons Learned from Past Projects

From the ex-post evaluation of previous railroad and metro projects, it has been learnt that the establishment of a financially independent project implementation structure is important from the standpoint of ensuring proper operation and maintenance. Since improvement of

ridership of the metro system is essential for financial soundness of CMRL, Tamil Nadu State Transport Authority is to rationalize bus routes so that the metro does not compete with bus passengers' demand and buses play a role of feeder networking for the metro. Moreover, CMRL is planning several businesses related to the metro such as advertising and property development in order to further improve the financial standing of the Project.

## **7. Plan for Future Evaluation**

### (1) Indicators to be Used

- 1) Operating rate (%/year)
- 2) Running distance (100km/day)
- 3) Number of running trains (trains/day, one direction)
- 4) Volume of transportation (million persons-km/day)
- 5) Income from Passengers (million rupees/day)
- 6) Internal rate of return: FIRR (%), EIRR (%)

### (2) Timing

Two years after the project completion

(END)