

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

### 1. Name of the Project

Country: Republic of India

Project: Ahmedabad Metro Project (I)

Loan Agreement: March 4, 2016

Loan Amount: 82,434 million yen

Borrower: The President of India

### 2. Background and Necessity of the Project

#### (1) Present State of Development and Problems of the Urban Transportation Sector in India

With the recent rapid urbanization, the number of registered automobiles and scooters in India has risen dramatically annually since FY 2002 at the average increase rate of 8%. On the other hand, the improvement of public transportation infrastructures has yet to meet the needs. In the large cities including Ahmedabad in the state of Gujarat, in particular, traffic congestion has become a serious problem in accordance with the increasing needs of the road transportation, which caused to economic loss and serious health damage due to air pollution, noise, and other pollution generated by automobiles. Thus, the improvement of public transportation system is necessary for reducing traffic congestion and improving urban environment.

In accordance with the advancement of urbanization thanks to economic growth, the population in Ahmedabad has increased from 3.42 million in 1991 to 5.59 million as of 2011 and become the fifth city in India (with the advancement, the population density has also increased from 7,300 person/km<sup>2</sup> in 1991 to 12,000 persons/km<sup>2</sup> as of 2011). Moreover, the number of registered vehicles has rapidly increased from 1.29 million in 2002 to 3.36 million in 2014. Hence, as well as economic loss in accordance with the escalating traffic congestion, air pollution and other environmental issues have been visualized. To address the population growth and incidental problems, the city commenced the operation of Bus Rapid Transport System (BRTS) in 2009, in addition to Ahmedabad Municipal Transport Service (AMTS), and strived to improve the public transportation network in the city. BRTS started its phase 2 projects in 2013. Currently, its transportation capacity is more than 145,000 passengers per day and the service operates every two minute at peak. However, the traffic congestion remains to be solved; hence, the enhancement of transportation capacity to respond to further growing transportation needs.

#### (2) India's Development Policies for the Urban Transportation Sector and the Role of the Current Project

In its Twelfth Five-Year Plan (April 2012 to March 2017), the Government of India focuses on the improvement of public transportation system from the perspectives of safety, energy efficiency, and social environment conservation, in addition to responding to transportation needs in accordance with the recent economic growth, and estimate its investment amount of 1,300 billion Indian rupee for the metro project implemented within the period of the Plan. The state of Gujarat also formulated its comprehensive transportation plan in the Ahmedabad Metropolitan Region in

2012. After the metro construction for promoting the use of public transportation was officially decided, the plan has been recognized as one of the priority project of the state government.

(3) Japan and JICA's Policy and Operations in the Urban Transportation Sector in India

In Japan's Country Assistance Program For India (May 2006), "promotion of economic growth" is set as one of the priority areas and assistance is to be provided to the development of city transportation system (railways, track roads, airports and ports) from the perspectives of realizing effective and efficient development in urban regions and industrial cluster areas. Moreover, given serious issues of economic loss and automobile pollution, such as air pollution, noise, etc., JICA Country Analysis Paper for India (May 2012) indicates the necessity of the improvement of large-scaled public transportation system in light of the urban development plan in order to reduce traffic congestion and mitigate automobile pollutions. Thus, the Project is consistent with the Program and Analysis. As of February 2016, JICA received authorization to provide ODA loans to India of the amount of 952 billion yen for 22 projects in the urban transport sector (which accounts for 68.4% of the transportation sector in India).

(4) Other Donors' Activities

In the urban transport sector, the World Bank provides its assistance through Mumbai Urban Transport Project (the improvement of roads and suburban railways) and to the improvement of the Eastern corridor in building freight-only railway lines. Asian Development Bank has assisted the railway sector especially through organizational reform of Indian Railway and other tangible support while provided its support to the urban railway sector; 250 million dollars to Bangalore Metro in March 2012 and 176 million dollars to Jaipur Metro in May 2014.

(5) Necessity of the Project

JICA has provided its support to metro projects in the metropolitan regions (Delhi, Bengaluru, Kolkata, Chennai, and Mumbai). Ahmedabad is also a metropolitan city with an equivalent size to them. The Project is expected to contribute to even economic development of the Ahmedabad Metropolitan Region through the reduction of traffic congestion and traffic pollution in the region, and also in line the issues and development policy of India as well as assistance policy of Japan and JICA. Therefore, JICA's support for implementing this project is highly necessary and relevant.

### **3. Project Description**

(1) Project Objective

By constructing a mass rapid transit system with the total length of 38 km in Ahmedabad, an economic city located in the state of Gujarat, this project is to address the increasing need for transportation, thereby developing the regional economy and improving the urban environment with reduced traffic congestion and traffic pollution as well as mitigating climate change.

(2) Project Site/Target Area

Ahmedabad Metropolitan Region, the state of Gujarat

(3) Project Components

1) Civil and construction works, track construction (international competitive bidding)

East-West Line: 19.4 km (elevated section: 13.1 km; underground section: 6.3 km)

North-South Line: 18.5 km (elevated section: 18.5 km)

2) Electrical and mechanical works, signal and telecommunication works (international competitive bidding)

3) Procurement of train cars: 93 cars (31 trains, 3 cars/train) (international competitive bidding)

4) Consulting services (design review, supporting bidding, construction supervision, etc.) (short-list method)

The loan is provided for: civil and construction works (or which part of elevated part and underground part), track work, electrical and mechanical works (excluding railyard), signal and telecommunication works, procurement of cars, and consulting services (of which needed after 2019)

#### (4) Project Cost

246,219 million yen (Loan amount: 112,793 million yen)

#### (5) Project Implementation Schedule/Cooperation Period

March 2016 – November 2020 (57 months in total). The project completion is defined as the commencement of the service.

#### (6) Project Implementation Structure

1) Borrower: The President of India

2) Guarantor: none

3) Executing Agency: Metro Link Express for Gandhinagar and Ahmedabad Co. Ltd. (MEGA)

4) Operation and Maintenance System: as above (3)

#### (7) Environmental and Social Considerations/Poverty Reduction/Social Development

##### 1) Environmental and Social Considerations

① Category: A

② Reason for Categorization:

The Project falls into the railway sector under the JICA guidelines for environmental and social considerations (April 2010) and is likely to have significant adverse impact due to its characteristics.

③ Environmental Permit:

The Environment Impact Assessment (EIA) Report of the Project was prepared while it is not mandatory under Indian laws, and approved by MEGA in November 2014.

④ Anti-Pollution Measures:

The Environment Impact Assessment (EIA) Report of the Project was prepared while it is not mandatory under Indian laws, and approved by MEGA in November 2014.

⑤ Natural Environment:

As the project site is not located in sensitive areas such as a national park or its vicinity, adverse effects of the project is expected to be minimal.

⑥ Social Environment:

The Project will require for approximately 92.1 ha of land acquisition and involuntary resettlement of 2,132 residents (533 households) and 510 of economic relocations. The procedures of land acquisition and resettlement will be carried out in accordance with the relevant domestic laws and procedures (an Indian new act concerning land acquisition:

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013) and the JICA guidelines for environmental and social considerations. Compensations and resettlement procedures will reflect to their demands for their relocating areas with improved infrastructure, etc. raised in the meetings with residents. There were no specified adverse opinions from residents affected by the Project against the implementation of the Project.

⑦ Other/Monitoring:

In the Project, MEGA will monitor air quality, water quality, waste, noise and vibration, land acquisition, involuntary resettlement, etc.

2) Promotion of Poverty Reduction

In the Project, the fee will be set taking into consideration of low-income users.

3) Promotion of Social Development (e.g. Gender Perspective, Measures to Prevent Infectious Diseases Including AIDS, Participatory Development, Consideration for Handicapped, 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, MEGA in cooperation with local NGOs has been implementing HIV/AIDS prevention activities by its own funds. At the same time, as a working environment policy, HIV/AIDS prevention clauses have been inserted in tender documents, and each contractor is expected to cooperate with efforts to prevent HIV/AIDS infection.

In addition, according to the laws of India, the stations and coaches are 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). Further, training in customer care for all frontline staffs including station clerks and crews is planned to be offered.

(8) Collaboration with Other Donors

None in particular

(9) Other Important Issues

None in particular

**4. Targeted Outcomes**

(1) Quantitative Effects

1) Operation and effect indicators

Indicators	Baseline (2015)	Target (2022) <sup>1</sup>
Operating Rate (%/year)	—	North-South Line: 92 East-West Line: 92
Running Distance (1,000 km/day)	—	North-South Line: 14.092
Number of Running Trains (No. of trains/day, one direction)	—	North-South Line: 254 East-West Line: 384
Volume of Transportation (million persons-km/day)	—	North-South Line: 0.9 East-West Line: 1.1

Passenger Revenue (million Rupee/day)	—	North-South Line: 8.2 East-West Line: 9.7
Average travel time (minutes) <sup>2</sup>	North-South Line: 70.0	North-South Line: 37.5 East-West Line: 42.0

<sup>1</sup> North-South Line: between APMC - Motera Stadium; East-West Line: between Thaltej – Vastral Gam.

<sup>2</sup> Baseline shows the average travel time taken by private vehicle.

## 2) Internal Rate of Return

Based on the conditions indicated below, the economic internal rate of return (EIRR) of the Project will be 21.58% and the financial internal rate of return (FIRR) will be 10.38%.

### 【EIRR】

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

Benefit: Effects of reducing operation and maintenance cost of transportation system and roads, travel time of uses of this line and other transportation users by reducing traffic congestion, fuel cost, car maintenance cost, and the number of traffic accidents and pollution.

Project Life: 30 years

### 【FIRR】

Cost: Project cost, operation and maintenance cost

Benefit: Fare revenue, advertisement revenue, revenue from real-estate development

Project Life: 30 years

## (2) Qualitative Effects

The qualitative effects of the Project include increase of convenience by securing punctuality of travel, improvement of air pollution, mitigation of climate change, and economic and social development in the Ahmedabad Metropolitan Region.

## 5. External Factors and Risk Control

(1) Precondition: none in particular

(2) External Factors: none in particular

## 6. Evaluation Results and Lessons Learned from Past Projects

(1) Results of Evaluation of Similar Past Projects

In the results of ex-post evaluations of Calcutta Metro Railways Construction Project, etc., it is pointed out that commitment of concerned stakeholders is essential for effective project execution, and discussion with inhabitants in the areas, in particular, for relocation should have been commenced earlier with the initiative of relevant authorities. In addition, there has been a delay in an ongoing project, Kolkata East-West Metro Project, due to different arguments on route between the State Government of West Bengal, the responsible entity for land acquisition, and the central

government and Kolkata Metro Rail Corporation in response to inhabitants' litigation for land acquisition. Since the State Government of West Bengal was excluded from the capital tie of Kolkata Metro Rail Corporation, ambiguous responsibility for the project has also become one of the factors of the delay.

(2) Lessons for the Project

The Project plan was formulated and implemented under the initiative of the state government. The procedures of land acquisition have also been initiated under the responsibility of the state government in coordination with MEGA. Resettlement plan was explained to concerned residents, and the project contents and compensation policy were also explained by visiting each household.

<b>7. Plan for Future Evaluation</b>
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(1) Indicators for Future Evaluation

- 1) Operating Rate (%/year)
- 2) Running Distance (1,000 km/day)
- 3) Number of Running Trains (No. of trains/day, one direction)
- 4) Volume of Transportation (million persons-km/day)
- 5) Passenger Revenue (million Rupee/day)
- 6) Average travel time (minutes)<sup>2</sup>

(2) Timing

Two years after project completion