

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The People's Republic of Bangladesh

Project: Dhaka Mass Rapid Transit Development Project (II)

Loan Agreement: June 29, 2016

Loan Amount: 75,571 million Yen

Borrower: The Government of the People's Republic of Bangladesh

2. Background and Necessity of the Project

(1) Current State and Issues of the Urban Development Sector in Bangladesh

The population of Dhaka, the capital of People's Republic of Bangladesh, has been growing rapidly and has increased from 6.62 million in 1990 to 14.64 million in 2010 (UN Population Division). This has led to drastic expansion of transportation demand and has caused problems such as chronic traffic congestion and the air pollution. This is hampering local socioeconomic activities with an estimated annual economic loss of 2,600 million US dollars (Dhaka Chamber of Commerce and Industry).

(2) Development Policies for the Urban Development Sector in Bangladesh and the Priority of the Project

In order to solve these problems, the Government of Bangladesh has set forth introduction of an urban Mass Rapid Transit (hereinafter referred to as "MRT") system in its national plans The Sixth Five Year Plan (FY 2011/12 - 2015/16) and following The Seventh Five Year Plan (FY 2015/16 - 2019/20). Also, Strategic Transport Plan for Dhaka (hereinafter referred to as "STP"), an urban transportation masterplan approved by the Government of Bangladesh in 2005, proposed the development of three MRT lines and three additional lines for Bus Rapid Transit (hereinafter referred to as "BRT"). Priority of the MRT and the BRT lines was assessed and analyzed in Dhaka Urban Transport Network Development Study (2009 - 2011) from the perspectives of transportation demand, project costs and the environmental and social consideration and MRT Line 6 was selected as the priority line. Dhaka Mass Rapid Transit Development Project (hereinafter referred to as "the Project") will construct MRT Line 6 that extends for approximately 20 km to connect northern Dhaka and the city center to contribute to the alleviation of the traffic congestion and the air pollution in the Dhaka Metropolitan Area.

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

Country Assistance Policy for Bangladesh (June 2012) positions "Acceleration of economic growth from which all the citizens can benefit" as a priority subject and states that Japan will take measures for development of the transportation and traffic infrastructure for facilitation of efficient travel of people and goods while considering diversification of transportation mode. In addition, the JICA Country Analysis Paper for Bangladesh (April 2013) identifies urban development as one of the priority issues. Thus, the Project is consistent with those

policies and analyses by the Government of Japan and JICA.

In addition to the aforementioned preparatory survey, JICA implemented Institutional Building Assistance for Dhaka Urban Transport Network Development (FY 2010), Institutional Building Assistance for Dhaka Urban Transport Network Development (II) (FY 2011) by dispatched ODA loan experts and Preparation of Rules and Regulations under Urban Mass Rapid Transit Act (Dhaka, Bangladesh) (Technical Assistance Related to ODA Loan) (FY 2013 - 2015) to assist establishment of urban transportation-related laws.

(4) Other Donors' Activity

The World Bank supported formulation of the aforementioned STP and has been supporting Clean Air and Sustainable Environment Project that includes detailed design of BRT Line 3 (The airport - Jhilmil) since 2009.

The Asian Development Bank has been supporting Greater Dhaka Sustainable Urban Transport Corridor Project that aims at construction of BRT Line 3 (Gazipur - The airport) by co-financing with French Development Agency and Global Environment Facility since 2010.

(5) Necessity of the Project

The Project is consistent with the development subject and development policy of the Government of Bangladesh, and with the aid policy and analyses of the Government of Japan and JICA. In addition, the MRT development may provide ample opportunities to utilize advanced technologies that Japan holds. As such, necessity for JICA to assist the Project is high.

3. Project Description

(1) Project Objective

The objective of the Project is to meet the increasing transportation demand in the Dhaka by constructing urban mass rapid transit system in Dhaka City, and thereby contribute to economic development of the entire Bangladesh through alleviating traffic congestion. It also aims at reduction of the air pollution in the Dhaka by promoting a modal shift from individual vehicle transportation to the public transportation.

(2) Project Site/ Target Area

Dhaka

(3) Project Components

- 1) Construction of railway structures (total length of approx. 20 km, construction of elevated railways, stations, tracks, etc.) (International competitive bidding)
- 2) Construction of a depot (land development, construction of depot buildings, railway sidings, etc.) (International competitive bidding)
- 3) Procurement of rolling stocks (International competitive bidding)
- 4) Installation of electric and signal systems (International competitive bidding)
- 5) General consulting service (detailed design, tender assistance, construction supervision, training on operation and maintenance, etc.) (Short List)

- 6) Consulting service for supporting resettlement of households (Short List)
- 7) Consulting service for supporting institutional development (Short List)
- (4) Estimated Project Cost (Loan Amount)
279,902 million Yen (Loan Amount 187,707 million Yen/ Loan Amount in this phase: 75,571 million Yen)
- (5) Schedule
February 2013 - January 2023 (120 months in total). The Project will be completed when the service commences in the entire route (July 2021).
- (6) Project Implementation Structure
 - 1) Borrower
The Government of the People's Republic of Bangladesh
 - 2) Guarantor: None
 - 3) Executing Agency
Dhaka Mass Transit Company Limited (DMTC)
 - 4) Operation and Maintenance System
Operation and maintenance will be implemented by Operation and Maintenance Group of DMTC (estimated number of employees before start of the operation is 1,616). The general consultant will provide technical instruction, advice and trainings for a few years before the service commencement and on-the-job training in the test run period. DMTC employees will acquire necessary skills and knowledge in this training period. In the financial aspect, 40% will be financed by the Government of Bangladesh while 60% will be supplied as a subleasing loan from the said government in concessional conditions to reduce the burden of principal and interest repayment. The institutional development consultants are currently in the process of establishing financial and managerial plans.
- (7) Environmental and Social Consideration / Poverty Reduction / Social Development
 - 1) Environmental and Social Consideration
 - ① Category: A
 - ② Reason for Categorization
The Project is categorized as a project in the railway sector and the one that has sensitive characteristics stipulated in the JICA Guidelines for Environmental and Social Considerations (April 2010).
 - ③ Environmental Permit
The Environmental Impact Assessment (EIA) report for the Project was formulated by the Dhaka Transport Coordination Authority and approved by the Department of Environment of Bangladesh on July 11th, 2011. Then, a revised EIA report was issued taking into account the factors in the detailed design, which is posted on the website of DMTC as of December 2015.
 - ④ Anti-Pollution Measures
Periodical water sprinkling will be performed to control dust anticipated in the construction process. As a measure to alleviate noise and vibration, noise reducers will be

applied to construction equipment and soundproof walls will be installed. Waste water from the stations and the depot while in use will be appropriately treated by waste water treatment facilities.

⑤ Natural Environment

The site of the Project is not located in or around sensitive areas such as a national park, and no rare species exist because the site is located in a developed urban area. Trees will be planted below the elevated railway structures as a compensation of logging for its construction.

⑥ Social Environment

As most of the construction is performed utilizing the space of the existing roads, the Project requires acquisition of 46.0 ha of land with 1,140 people subject to the impact. Land acquisition and resettlement of households are implemented in compliance with the applicable domestic laws and the JICA Guidelines for Environmental and Social Considerations, as well as Resettlement Action Plan (RAP) formulated by the executing agency. Briefing to residents concerning the EIA report and the RAP has been performed in the stages of scoping, formulating the EIA report and establishing the RAP. In the briefing, the project outline, planned routes, countermeasures to issues which may impose impact on the natural and social environment, outline of the RAP draft and contents of compensation were explained.

⑦ Other / Monitoring

In the Project, the contractor under the supervision of the executing agency during the construction period, and the executing agency after the service commencement, will monitor the possible air pollution, noise and vibration, water quality as well as progress of land acquisition and resettlement of households concerned.

2) Promotion of Poverty Reduction

N/A

3) Promotion of Social Development

Safety of female passengers is not ensured in the public transportation in Bangladesh, which makes women feel reluctant to use the public transportation. In this context, a gender action plan will be promoted including operation of women-only cars in rush hours and installation of security cameras in the trains and stations, to ensure safety of women in the trains and stations and to enhance understanding about gender issues. For this reason, the Project is specified as a project that includes gender-related activities.

(8) Collaboration with Other Donors

N/A

(9) Other Important Issues

The MRT development may provide ample opportunities to introduce advanced technologies that Japan holds (superiority of measures for soft ground, construction in limited space of land and automatic toll collecting system, etc.).

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicator)

Indicator	Baseline (Actual value in 2009)	Target (in 2023) 【Expected value two years after project completion】
Number of passenger (thousand persons · km/day)	NA	4,193
Running distance (km/day)	NA	6,528
Travel time (minutes) *	105	36
Operating rate of rolling stocks (%)	NA	80

* Time to travel in the Project area (between Uttara North station and Motijheel station)

2) Internal Rate of Return

Based on the conditions indicated below, Economic Internal Rate of Return (EIRR) of the Project is 25.7%, and Financial Internal Rate of Return (FIRR) is 3.1%.

EIRR: Cost: Project cost (excluding tax) and operating and maintenance costs

Benefit: Reduction in the running cost, reduction in travel time, etc.

Project life: 40 years

FIRR: Cost: Project cost and operating and maintenance costs

Benefit: fare yields

Project life: 40 years

(2) Qualitative Effects

1) Fulfilment of transportation demand in the Dhaka

2) Reduction of air pollution through promotion of using the public transportation and alleviation of climate change by GHG reduction

5. External Factors and Risk Control

Acquisition of land and submission of RAP and EIA shall be completed before bidding.

6. Lessons Learned from Past Projects

(1) Lessons Learned from Past Projects

Ex-post evaluation of Metro Manila Strategic Mass Rail Transit Development Project in the Philippines indicates that fare yield alone may not be enough to cover the cost of an urban railway project due to its large initial investment, and so input of capitals and subsidies from the national government is essential. It also points out that formulation of a detailed financial plan and an action plan of support by the government is necessary from the early stage of project establishment in order to ensure financial soundness of the executing agency.

(2) Application of Lessons Learned to the Project

In implementing the Project, ensuring financial soundness is essential as the volume of

initial investment is very large. In order to achieve this based on the aforementioned lessons learned, appropriate fare will be set, and a part of the yen loan will not be a subleasing loan but capital injection by the borrower government. Meanwhile, the institutional development consulting service will support DMTC in setting up a financial plan and its implementation.

7. Plan for Future Evaluation

(1) Indicators to be Used

1) Number of passenger (thousand persons · km/day), running distance (km/day), travel time (minutes), operating rate of rolling stocks (%)

2) Economic Internal Rate of Return (EIRR) (%), Financial Internal Rate of Return (FIRR) (%)

(2) Timing: Two years after the completion of the Project.