Japanese ODA Loan

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The Republic of the Union of Myanmar
Project: Yangon Circular Railway Line Upgrading Project
Loan Agreement: October 16, 2015
Loan Amount: 24.866 billion yen
Borrower: The Government of the Republic of the Union of Myanmar

2. Background and Necessity of the Project

(1) Current State and Issues of the Power Sector in Myanmar

Yangon, which is the former capital of the Republic of the Union of Myanmar (hereinafter, "Myanmar"), is the country's largest commercial city with a population of approximately 5.1 million. As the center of economic activity, Yangon is facing a rapid urbanization in recent years, and according to the Greater Yangon Strategic Urban Development Plan (March 2013), which JICA cooperated in drafting, the population is expected to top 9.5 million by 2035. To address urban transportation problems, such as road congestion due to car-based mobilization, there is a need to update aging infrastructure and develop a people-friendly, environmentally friendly public transportation network.

In the city, the Yangon Circular Railway Line, which is operated by Myanma Railways (MR), has 38 stations along an approximately 46-km route. In total 122 trains operate each day. However, the deteriorated state of the facilities, equipment, and rolling stock frequently cause reduced running speeds, schedule delays, and derailment accidents. Rail has a low percentage of users, providing a mere 1% of the city's public transportation services, where many residents use buses. This project is positioned as one of the priorities in the Yangon Urban Transport Master Plan (draft) JICA assisted in preparing. There is a need to realize a safe, comfortable transportation service that can support increased traffic demand and modal shift by updating and improving rolling stock and the rail signalling system.

(2) Development Policies for the Railway Sector in Myanmar and Priority of the Project

In June 2012, President Thein Sein announced the second phase of the Framework for Economic and Social Reforms. This framework cites (1) "industrialization based on agriculture," (2) "fair and equal growth," (3) "improved statistics," and (4) "promotion of trade and investment as growth engines" as key national policies. Railway sector development contributes to stimulating economic activities in areas along railroads, and thus corresponds to (2) "fair and equal growth" and (4) "promotion of trade and investment as growth engines."

The Ministry of Rail Transportation and MR envision to put development of railway

lines and railway connection plans with neighboring countries on hold, and instead work to improve and modernize existing trunk railway lines.

(3) Japan and JICA's Policy and Operation in the Railway Sector

According to the Japanese government's aid policy for economic Cooperationto Myanmarestablished in April 2012, "assistance for development of infrastructure and related systems necessary for sustainable economic development" is positioned as the main target, with "operational improvement and modernization of railways" listed as one specific measure. Therefore, this project is consistent with the policy.

Additionally, the Japan Revitalization Strategy, which was approved by the Cabinet in June 2013, states that Japan will "implement the 'Infrastructure Export Strategy' promptly and steadily" and refers to strategic use of "yen loans as well as private sector investment finance" in order to "expand exports of infrastructure, etc. by Japanese companies and local governments" for railways and various other infrastructure. This project is also in line with this strategy.

JICA's aid track record includes assistance with procurement of rolling stock for MR and procurement of facilities and equipment for rolling stock upgrades and assembly through loan aid in the " Railway Rehabilitation Project (1)" (1982) and "Railway Rehabilitation Project (2)" (1984). JICA began technical cooperation through the "Project on Improvement of Service and Safety of Railways" in May 2013 and has been working to enhance administrative capacity, maintenance, and management. In May 2014, a Grant Agreement was signed in the "Project for Installation of Operation Control Center System and Safety Equipment," which is developing a signal system and operation control center between Yangon Central station and Pyuntaza station. In September 2014, a Loan Agreement was signed under the "Yangon-Mandalay Railway Improvement Project Phase 1 (1)," which aims to upgrade the tracks, civil engineering, signalling system, and so on as well as replace the rolling stock between Yangon and Toungoo.

(4) Other Donors' Activities

In the 1990s, Germany provided technical support for maintenance and management of railway facilities. China is supporting construction of a locomotive factory, while India supports procurement of freight cars. In September 2014, Korea announced support for new procurement of 100 passenger coaches through financing of approximately 3.5 million US dollars by loan. Other projects being planned by MR are listed below. The countries and agencies consulted follow in parentheses.

- •Locomotive engine upgrades, factory construction (China)
- •Mandalay-Myitkyina Railway Line upgrades (Korea)
- •Bago-Dawei Railway Line upgrades (ADB)
- •Tamu-Mandalay Railway Line upgrades (India)

Although this does not involve foreign aid, signal systems that MR procured from manufacturers in China and India on its own have been installed in some sections of

the Yangon-Mandalay line. Additionally, many used diesel trains have been purchased from Japanese railway companies; thus far, more than 200 trains have been imported.

This project does not overlap with those of other aid agencies, including in terms of scope.

(5) Necessity of the Project

As described above, the project is consistent with Myanmar's agenda, the development policy, and the assistance priority areas of the Japanese government and JICA. Therefore, JICA's support in implementing the project is highly necessary and relevant.

3. Project Description

(1) Project Objectives

The objective of the Project is to improve the efficiency of passenger transport capacity, and the safe and comfortable public transport services of Yangon Circular Railway Line by rehabilitating and replacing the existing railway facilities and the rolling stock, thereby contributing to the social and economic development of Greater Yangon.

(2) Project Site/Target Area

Yangorn Region, Yangon City

(3) Project Components

Of the Yangon Circular Railway (approx. 46 km), signalling system replacement and new rolling stock procurement for the 44-km section that excludes the signalling system (electronic interlocking devices, train monitoring devices, and railroad crossing automatic alarm devices) for the 2-km section, which will be covered by the "Project for Installation of Operation Control Center System and Safety Equipment," will be provided by yen loan, while upgrading of tracks, civil engineering, and related facilities will be performed by the executing agency on the Myanmar side at their own cost.

1) Procurement and installation of a signalling system (electronic interlocking devices, railroad crossing automatic alarm devices, train monitoring devices, etc.; target section: 44 km in total)
2) Procurement of rolling stock (Diesel Electric Multiple Unit: DEMU)
3) Civil engineering/facility repair work (paid for by Myanmar)
   i. Track repairs (rail track rehabilitation, rail welding, etc.)
   ii. Civil engineering repairs (drainage facilities, roadbed improvements, bridge rehabilitation, etc.)
   iii. Facility repairs (platforms, rolling stock buildings, fences, power supply facilities, etc.)
4) Consulting services (bidding support, procurement supervision, implementation promotion assistance for construction paid for by Myanmar, maintenance and

management capacity enhancement, technology transfer, training, and management improvement)

(4) Estimated Project Cost

36.276 billion yen (Loan amount: 24.866 billion yen)

(5) Schedule/Cooperation Period

From October 2015 to April 2022 (total of 79 months). Project completion is defined as completion of signalling system installation work (April 2020).

(6) Project Implementation Structure

1) Borrower: The Government of the Republic of the Union of Myanmar

2) Guarantor: N/A

3) Executing Agency: Myanmar Railways (MR)

4) Execution, Operation/Maintenance, Management: Myanmar Railways (MR)

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

1) Environmental and Social Considerations

(i) Category: B

(ii) Reason for Categorization:

The project does not fall under the category of large-scale harbors, transmission lines, substations, and distribution lines for the power sector as specified in the “Japan International Cooperation Agency Guidelines for Environmental and Social Considerations” (issued in April 2010, hereinafter, the “JICA Guidelines”), and is deemed to have minimal adverse impacts on the environment. In addition, the project does not have any characteristics likely to cause an impact or areas that are susceptible to impacts as specified by the JICA Guidelines.

(iii) Environmental Permit:

Myanmar's domestic laws do not require preparation of an Environmental Impact Assessment (EIA) report concerning the project.

(iv) Anti-Pollution Measures:

Taking measures against air pollution and water contamination expected during construction work, such as maintaining construction machinery, reducing the amount of dust by sprinkling water, and constructing sewage facilities and a sedimentation basin as needed, are expected to minimize impacts. Adjustments in the work schedule and maintenance of construction machinery will also be implemented to minimize expected noise levels during construction. As for noise and vibrations while in service, significant negative impacts are not expected owing to project improvements. Monitoring will confirm whether residents have complaints, and measures will be taken as necessary.

(v) Natural Environment:

The project's target area is not a sensitive area such as a national park, nor nearby such an area; therefore, adverse impacts on the natural environment are expected to be minimal.

(vi) Social Environment:

The project will be carried out on land owned by the executing agency, so there is no need for land acquisition. However, to ensure safety along the railway in response to the increase in speed on the railway, a safe clearance of 2.5 meters must be secured on both sides as measured from the center of the track. Involuntary relocation of 48 residents as well as agricultural compensation for 15 residents will be necessary. Relocation and compensation will proceed in accordance with domestic procedures and the simple resettlement plan. Discussions were held with residents regarding relocation. Affected residents have expressed no strong dissenting opinions regarding the project.

(vii) Other/Monitoring:

During construction and after the facility has been put into service, MR will monitor air pollution, water quality, noise, and so on.

2) Promotion of Poverty Reduction: N/A

3) Promotion of Social Development (e.g. Gender Perspectives, Measures for Infectious Diseases including HIV/AIDS, Participatory Development, Considerations for People with Disabilities, etc.):

Gender activity integration project: The project ensures accessible public transportation, which is expected to facilitate means of transportation for women, children, and minorities as well as to promote opportunities to participate in socioeconomic activities.

Measures for infectious diseases including AIDS/HIV: This is a large-scale project in which construction workers will be concentrated in specific places for long periods of time in a country where AIDS infections are concerned. Therefore, executing agencies must include a section on AIDS countermeasures in the bidding document for contractors as well as require that contractors carry out programs for construction workers to combat AIDs.

Considerations for people with disabilities: For the detailed design of new rolling stock, the "Barrier-free Facilitation Guidelines (Vehicles Edition)" from the Ministry of Land, Infrastructure, Transport and Tourism of Japan will be referenced to ensure specifications account for people with disabilities and women. Assistance in basic design for civil engineering and facilities paid for by Myanmar will also reflect relevant guidelines.

(8) Collaboration with Other Donors

None in particular.

4. Target Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicators)

Indicator	Baseline (Recorded in 2015)	Target (2022) 【2 years after completion】
Amount of passenger transportation (person x km / day)*	850,200	2,140,000
Frequency of train services (per day)*	122	175
Car-km (km per day)*	2,860	4,100
Train intervals (min)*	15-45	10-12
Time to travel one circuit (min)	170	110
Accidents per year (incidents)	19 (recorded in 2014)	0-1 (including unexpected accidents)

* Includes all sections of the Yangon Circular Railway

2) Internal Rate of Return

Based on the following preconditions, the Economic Internal Rate of Return (EIRR) is 20.68% and the Financial Internal Rate of Return (FIRR) is 5.24%.

【EIRR】

Cost: Project costs (excluding tax), operation/maintenance costs

Benefits: Reduced transportation time for railway users and road traffic users, reduced travel costs, increased fare revenue

Project life: 40 years

【FIRR】

Cost: Project costs (excluding tax), operation/maintenance costs

Benefit: Fare revenue

Project life: 40 years

(2) Qualitative Effects

Realization of safe, efficient passenger transportation; realization of comfortable public transportation services; and stimulation of socioeconomic activities in the Yangon metropolitan area

5. External Factors and Risk Control

•Decreased cargo or passenger transportation volume due to rapid deterioration of Myanmar's economy

•Significant changes in policies for the rail transportation sector

6. Lessons Learned from Past Projects

(1) Results of Evaluations of Similar Past Projects

The ex-post evaluation of the "Railway Rehabilitation Project (2)" in Myanmar noted that MR constantly faces the problems of spare parts shortages and an insufficient number of rail engineers, and thus there is a need to improve the maintenance and management system. Additionally, the ex-post evaluation of the "Chongqing Urban Railway Construction Project" in China noted that the amount of passenger transportation expected at the time of the project preparation stage was not being reached. Excessive estimation of passenger transportation demand as well as a low user growth rate due to delays in the expected development of residential areas around the station were listed as causes. The review notes that, when developing a project plan, demand prediction must be presented after sufficient consideration or confirmation of plans regarding networking of rail traffic and residential development from the start through to completion of the project.

(2) Lessons for the Project

Based on these lessons, regarding spare parts shortages, spare parts required for two years after completion of this project will be provided. Additionally, measures such as inclusion of maintenance clauses, etc., including the delivery method for spare parts/scheduled procurement, should be considered during the detailed design stage of the Project.

Regarding insufficient engineer capacity, the “Project on Improvement of Service and Safety of Railways” (ongoing since 2013) will be utilized to develop policies for railway facility maintenance and management as well as to improve technical capabilities. Additionally, engineers in charge of enhancing operation and maintenance supervision capabilities will participate in the construction supervision phase as part of the consulting service for the main project in order to offer advice on technical problems.

As for demand prediction, the traffic survey and results from the demand prediction analysis conducted in the Yangon Urban Transport Master Plan (draft) were utilized, and the amount of passenger transportation was predicted based on verification of project effects in order to develop the project plan.

7. Plan for Future Evaluation

(1) Indicators to Be Used in Future Evaluations

1) Amount of passenger transportation (person x km/day)
2) Amount of cargo transportation (tons x km/day)
3) Frequency of train services (per day)
4) Car-km (km per day)
5) Time to travel one circuit of the Yangon Circular Railway (min)
6) Fare revenue (Kyat/year)
7) Economic Internal Rate of Return (EIRR) (%)
8) Financial Internal Rate of Return (FIRR) (%)

(2) Timing of the Next Evaluation

Two years after project completion