

Ex-Ante Evaluation

1. Name of the Project

Country: The Republic of the Union of Myanmar

Project: Power Distribution Improvement Project in Yangon Phase I

Loan Agreement: June 30, 2015

Loan Amount: 6,105 million 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 Electric Power Sector in Myanmar

In Myanmar, thanks to the start of operation of large hydropower generation plants in 2005, the total power generation capacity of facilities has increased to approximately 3,700 MW (2013). However, due to restrictions on hydropower generation during the dry season as well as due to the aging of facilities, the actual maximum power supply remains at the level of 1,500 MW (2013), while total electricity demand is around 2,000 MW (2013). Therefore, the government has no choice but to create planned power outages in order to compensate for the supply shortage of approximately 500 MW. In the Yangon Region, which has the highest electricity demand in Myanmar, total electricity demand reaches approximately 900 MW (2013) during the dry season, causing power supply shortages.

Many of the power supply facilities in Myanmar were built more than 50 years ago, and no facilities that have been properly designed to handle demand load have been developed. Therefore, power transmission and distribution losses account for as much as approximately 25% (transmission losses: approximately 7%; distribution losses: approximately 18%) of the use of all electricity generated in Myanmar and for approximately 18% in the Yangon Region. Also, due to the aging of transformation facilities used to supply electricity to the Yangon Region, there is a high risk of power failures resulting from long-term use of facilities under excess load. Many failures and accidents occurred during the dry season of 2013, leading to concerns about large-scale power outages. In the Yangon Region, where electricity demand is predicted to increase to two or three times the current level in five years, there is an urgent need to reduce transmission and distribution losses, which account for approximately 25% of all electricity generated, as well as to increase the electricity supply.

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

Myanmar has made eliminating the need for planned power outages by repairing existing power facilities in the short term a priority goal of its electricity policy. The Yangon City Electricity Supply Board has drafted five-year plans to develop power grids in the Yangon Region (for the period from 2010/11 to 2015/16 and for the period

from 2016/17 to 2019/20). In an effort to increase the power supply and to repair inadequate facilities, the board has adopted a policy of increasing the voltage of local power grids from 33 kV to 66 kV and from 6.6 kV to 11 kV as well as repairing existing substations. The current project, which is being implemented based on these plans, has high priority as a project aimed at improving the balance between electricity supply and demand in the Yangon Region, the largest electricity consumer in Myanmar.

(3) Japan and JICA's Policy and Operations in the Electric Power Sector

The economic cooperation policy for Myanmar, which was established on April 21, 2012, places high priority on providing support to develop the infrastructures and systems required for sustained economic growth. The current project contributes to Myanmar's sustained economic growth by alleviating the electricity supply shortage in the Yangon Region. As such, this project is consistent with the policies of both Myanmar's and Japan's governments.

In the electric power sector, JICA is implementing a number of projects, including "The Project for Rehabilitation of Baluchaung No.2 Hydropower Plant" (Grant Aid) and "Urgent Rehabilitation and Upgrade Project Phase 1" (Japanese ODA Loan).

(4) Other Donors' Activity

The Asian Development Bank (ADB) is implementing a project to improve the power distribution system in three townships in the northern district and two townships in the western district among the 47 townships in the Yangon Region. In addition, Thailand's Neighboring Countries Economic Development Cooperation Agency (NEDA) plans to improve the power distribution system in three townships in the eastern district in the Yangon Region. The International Finance Corporation (IFC) is also supporting Yangon City Electricity Supply Board's conversion into a corporation.

(5) Necessity of the Project

As described above, this project is consistent with Myanmar's policies on development issues as well as Japan's and JICA's assistance policies in high-priority areas. Therefore, it is necessary and highly relevant for JICA to support this project.

3. Project Description

(1) Project Objectives

The objective of the Project is to improve the reliability of power supply and reduce distribution loss by repairing and reinforcing the existing distribution facilities in the Yangon Region, the largest electricity consumer in Myanmar, thereby contributing to economic development of Myanmar as a whole and improvement in people's living standards.

(2) Project Site/Target Area

Yangon Region

(3) Project Components

- 1) Renovation and Enhancement of 66kV Substations (4 townships)

- 2) Introduction of Multi-transformer System (6 townships)
 - 3) Procurement of Distribution Lines (11 townships)
 - 4) Procurement of Utility Vehicles (4 vehicles)
 - 5) Consulting Services (Detailed Design, Tender Assistance, Construction Supervision, etc.)
- (4) Estimated Project Cost (Loan Amount)
6.745 billion yen (Total loan amount: 6.105 billion yen)
- (5) Schedule
June 2015 to June 2020 (60 months in total). The project will be completed when all facilities are placed into operation (June 2019).
- (6) Project Implementation Structure
- 1) Borrower: The Government of the Republic of the Union of Myanmar
 - 2) Guarantor: None
 - 3) Executing agency: Yangon City Electricity Supply Board, Ministry of Electric Power
 - 4) Operation and maintenance system: Yangon City Electricity Supply Board
- (7) Environmental and Social Considerations/Poverty Reduction/Social Development
- 1) Environmental and social considerations
 - (1) Category: B
 - (2) Reason for categorization: This project does not fit the definition of a large-scale Power transmission and distribution lines sector project described in JICA's Guidelines for Environmental and Social Considerations (issued in April 2010) and is unlikely to have any serious adverse environmental impacts. In addition, the targeted area does not have, nor is expected to have, any of the environmental impacts specified in the guidelines.
 - (3) Environmental permit: Myanmar's domestic laws do not mandate preparation of any Environmental Impact Assessment (EIA) reports.
 - (4) Anti-pollution measures: Adverse impacts are likely to occur, including air pollution and water contamination during construction work as well as noise and vibrations during facility operation. Such adverse impacts will be minimized by spraying water and treating leachate during construction as well as by designing facilities to reduce noise in addition to alleviating noise and vibrations during facility operation. Soundproof barriers and other equipment may also be used as needed.
 - (5) Natural environment: The project site is not located in or around sensitive areas such as national parks, and adverse impacts on the natural environment are assumed to be minimal.
 - (6) Social environment: This project aims to renovate and expand existing facilities and does not involve land acquisition or resident relocation.
 - (7) Other / Monitoring: The executing agency will monitor air pollution and water

contamination during construction as well as noise and vibrations during facility operation.

2) Promotion of Poverty Reduction: None

3) Promotion of Social Development (e.g., Gender Perspectives, Measures for Infectious Diseases Including HIV/AIDS, Participatory Development, Considerations for People with Disabilities, etc.): None

(8) Collaboration with Other Donors: None

(9) Other Important Issues: This project aims to reduce electricity transmission and distribution losses, and thus contributes to reducing greenhouse gas (GHG) emissions.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance indicators (operation and effect indicators)

Indicator	Baseline (Actual value in 2012)	Target (2021) (Expected value 2 years after project completion)
Substation Transformer Installation Capacity (MVA)	50	180
Electricity Supply (GWh)	462	1,284
No. of Transformers Installed*	-	828

* The number of transformers installed for the multi-transformer system (a system designed to reduce the distance of low-voltage lines and to prevent power losses by reducing the capacity of transformers and installing many transformers in order to reduce the long span of low-voltage lines and overcurrent that cause power losses.)

2) Internal rate of return

Based on the conditions indicated below, the Economic Internal Rate of Return (EIRR) of this project is calculated to be 22.5%, and the Financial Internal Rate of Return (FIRR) to be 11.9%.

[EIRR]

Cost: Project costs and management/maintenance costs

Benefit: Increased power supply

Project life: 30 years

[FIRR]

Cost: Project costs and management/maintenance costs

Benefit: Revenue from the sale of electricity

Project life: 30 years

(2) Qualitative Effects

Economic development of Myanmar as a whole and improvement in people's living standards

5. External Factors and Risk Control

None

6. Lessons Learned from Past Projects

The ex-post evaluation of “Distribution System Reliability Improvement Project” in Thailand shows that delays in obtaining permission from other government agencies resulting from burying power lines that interfere with road construction and preservation of historical architecture was one cause of project delays. This project taught us that it is important to review how to prevent project delays based on past projects' actual project periods.

In this project, when installing transformers or utility poles along roads, the Yangon City Development Committee, which manages roadside trees and roads, and the YESB must work in close coordination to draw up plans, and JICA shall periodically check the progress of coordination.

7. Plan for Future Evaluation

(1) Indicators to Use

- 1) Substation Transformer Installation Capacity (MVA)
- 2) Electricity Supply (GWh)
- 3) Number of Multi-transformer Systems
- 4) EIRR and FIRR

(2) Timing: 2 years after project completion