

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country : The Republic of the Union of Myanmar

Project : National Power Transmission Network Development Project Phase I

Loan: March 26, 2015

Loan Amount : 24,678 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 Power Sector in Myanmar

The electric demand in Myanmar has been rising rapidly against the background of its steeply growing economy. Peak demand for power in Myanmar nationwide in 2013 was around 1,500 MW, and Yangon area accounts for the half of it (around 900 MW). The 230 kV transmission line running from north to south plays a crucial role as the backbone of the country's power network. According to the "National Electricity Master Plan", which was formulated with support from JICA, it is estimated that the electrical power transmission volume on the 230 kV trunk transmission line has already exceeded its capacity in some sections as of 2014. Additionally, the long transmission distance from the north to the south causes voltage drop, showing the high transmission loss rate of 25.5%. Furthermore, since there is only a single circuit on the existing 230 kV transmission line, and the deteriorated equipment has been used for many years in an overloaded state, the risk of accidents is high, with large-scale power outages also a concern.

Under such circumstances, it is necessary to construct and reinforce the trunk transmission line and related substations and to upgrade the higher voltage 500kV system, maximize the transmission capacity from north to south by connecting the trunk transmission lines.

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

President U Thein Sein, in his address on 9th August, 2013, expressed the electrical power sector as a priority issue for socioeconomic development. The development of 500kV transmission lines and related substations, which are included in the Project, is also described in the Five Year Plan formulated by Ministry of Electrical Power in Myanmar. The Project is therefore in line with the country's development policies for power system development plan.

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

Japan's Country Assistance Program for Myanmar (April 2012) suggests a policy of "Assistance to development of infrastructure and systems necessary for sustainable economic growth" as one of Myanmar's priority area. The Project will contribute to sustainable economic growth by development of the power transmission network, and is therefore in line with the policy. JICA has also implemented the "Urgent Rehabilitation and Upgrade Project Phase I" to improve major power stations and substations in the Yangon region, as well as the "Project for Rehabilitation of Baluchaung No. 2 Hydropower Plant".

(4) Other Donor's Activity

For the 500 kV transmission line from Meikhtila to Taungoo, which is connected to the Project, a private Serbian company will provide equipment and materials, and the Myanma Electric Power Enterprise will supervise the construction. Assistance of the 500 kV transmission line from Taungoo to Phayargyi is also being provided by the Export-Import Bank of Korea's Economic Development Cooperation Fund (EDCF) .

(5) Necessity of the Project

As described above, the Project is consistent with Myanmar's development agenda and policies, as well as with the assistance priority areas of Japan and JICA. Therefore, the necessity and relevance for JICA's support in implementing the Project is high. Additionally, by prioritizing the development of the substation facilities for the 500 kV transmission line between Meikhtila and Taungoo, which will be constructed first, the Project will contribute to the transmission network from the north to south.

3. Project Description

(1) Project Objectives : The objective of the Project is to increase the transmission capacity and improve system reliability by construction of high voltage substations along the national grid connecting the north to the south, thereby contributing to economic development in Myanmar.

(2) Project Site/Target Area : Mandalay Region, Bago Region

(3) Project Components (including the method of procurement)

1) Construction of 500 /230 kV Substations (Meikhtila, Taungoo)

2) Consulting Services (detailed design, tender assistance, construction supervision, support for environmental and social considerations, etc.)

(4) Estimated Project Cost

31,189 million yen (Loan Amount: 24, 678 million yen)

(5) Schedule

From March 2015 to September 2020 (total of 67 months). Project completion is defined as when the facility is officially provided.

(6) Project Implementation Structure

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

2) Guarantor : N/A

3) Executing agency : Ministry of Electric Power, Myanma Electric Power Enterprise (MOEP, MEPE)

4) Operation, Operation/Maintenance, Management: MEPE

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

1) Environmental and Social Consideration

(i) Category : B

(ii) Reason for Categorization : The Project does not fall under the large-scale transmission lines, substations, and distribution lines of power sectors as specified in the "Japan International Cooperation Agency Guidelines for Environmental and Social Consideration" (issued in April

2010, hereinafter referred to as “JICA Guidelines”), and is deemed to have minimal adverse impacts on the environment. In addition, the Project does not include any characteristics likely to cause an impact or areas susceptible to impact as specified by JICA Guidelines.

- (iii) Environmental Permit : At this time, Myanmar’s domestic laws do not require preparation and approval of an Environmental Impact Assessment (EIA) report concerning the project. However, if one becomes necessary when the country establishes regulations for environmental protection, a report will be created and the necessary applications and permissions will be obtained from the Environmental Conservation Department of the Ministry of Environmental Conservation and Forestry.
 - (iv) Anti-Pollution Measures : During construction work, air and water pollution are expected, as are the negative impacts of noise and vibration after the facility is placed in service. However, measures such as water sprinkling and leachate treatment during construction will mitigate pollution. To decrease noise and vibration while in service, a noise-suppressing design will be used for the facilities, and sound proof barriers will be installed as necessary. With this, negative impacts on are expected to be minimal.
 - (v) Natural Environment : The target area for the project is not in a sensitive area such as a national park, nor in the surrounding area of such; therefore, adverse impact on the natural environment is expected to be minimal.
 - (vi) Social Environment : Due to the land acquisition necessary for this project, a total of 28 household will be affected, including two households that will be involuntarily relocated. In accordance with JICA environmental guidelines, land acquisition and resident resettlement will proceed by following a simple resettlement plan created by MEPE. There have been no particular dissenting opinions during discussions with the affected households; compensation and assistance will be provided in the future by MEPE as per their plan.
 - (vii) Other/Monitoring : The implementing agency will monitor air pollution, waste materials, noise, and labor conditions during construction.
- 2) Promotion of Poverty Reduction : N/A
- 3) Promotion of Social Development : N/A
- (8) Collaboration with Other Schemes and Donors : EDCF plans to provide assistance for the 500 kV transmission line project between Taungoo and Phayargyi. Serbia will also provide equipment and materials (ACSR power lines, insulators, etc.) to MEPE. The Project will be implemented taking the progress of these other projects into consideration.
- (9) Other Important Issues : This project is also projected to contribute to measures for mitigating climate change. Estimated volume of suppressed CO₂ gas emissions: 246,738 tons/year.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators

Indicator (Unit)		Baseline (value in 2013)	Target (2021) 【2 years after completion of the project】
Transformer Availability factor (%)	Meiktila substation	-	32
	Taungoo substation	-	20
Annual Energy (GWh/year)	Meiktila substation	-	2,502
	Taungoo substation	-	800
Voltage Fluctuation (%)		-	±5%

2) Internal Rate of Return : Based on the following preconditions, the Economic Internal Rate of Return (EIRR) is 11.3% and the Financial Internal Rate of Return (FIRR) is 10.2%. (Note that these calculations are based on the completed construction of the Phayargyi and Hlaingthayar substations and 500 kV transmission lines between Phayargyi and Hlaingthayar, in addition to the two substations (Meikhtila, Taungoo) targeted for this project.)

【EIRR】

Cost : Cost of project (tax excluded), cost of operation/maintenance

Benefit : Reduction in the cost of procuring alternate power

Project life : 30 years

【FIRR】

Cost : Cost of project, cost of operation/maintenance

Benefit : Increase in the amount of energy sold

Project Life : 30 years

(2) Qualitative Effect : Increased stability of the domestic electricity supply, promotion of social and economic development

5. External Factors and Risk Control

- Decreased demand for electricity due to a sudden downturn in the Myanmar economy.
- Sweeping policy changes in the power sector.

6. Evaluation of Similar Projects and Lessons Learned from Past Projects

(1) Results of Evaluation of Similar Past Projects : It was learned from the ex-post evaluation of the Transmission System and Substation Development Project (7-2) in Thailand that the development of a unique operation and maintenance manual for each substation allows for actual operation and maintenance conditions to be shared between substations. It is thus desirable to strengthen operation and maintenance through the development of best practices for such.

(2) Lessons for the Project : This project will construct the first 500 kV substation in Myanmar. An operation and maintenance manual will be created with support from the Consultant. When other 500 kV substations are constructed, this manual will not only be used for actual operation and maintenance, but also as a reference for improving the operation and maintenance manuals for 230 kV substations. This idea has been confirmed with the Executing Agency.

7. Plan for Future Evaluation

(1) Indicators to be Used in Future Evaluations

- 1) Transformer Availability factor (%)
- 2) Annual Energy (GWh/year)
- 3) Voltage Fluctuation (%)
- 4) Economic Internal Rate of Return (EIRR) (%)
- 5) Financial Internal Rate of Return (FIRR) (%)

(2) Timing for Next Evaluation

Two years after completion of the Project

End