

## Ex-Ante Evaluation

### 1. Name of the Project

Country : The Democratic Socialist Republic of Sri Lanka

Project : Habarana-Veyangoda Transmission Line Project

Loan Agreement: March 28, 2012

Loan Amount: 9,573 million yen

Borrower: The Government of Democratic Socialist Republic of Sri Lanka

### 2. Background and Necessity of the Project

#### (1) Current State and Issues of the Power Sector in Sri Lanka

Driven by recent economic growth (average annual growth rate: 7%), Sri Lanka's energy demand has been growing rapidly (actual peak demand: 1,868MW in 2009; forecast peak demand: 4,501MW in 2020). This has led to the development of large-scale electric power to meet the increasing power demand. Transmission lines, on the other hand, have not been upgraded sufficiently and the whole system has become dilapidated, resulting in a transmission loss as high as 13%. At present, 132kv transmission lines, which were designed 40 years ago, are used for the main long-distance transmission lines. To augment the transmission capacity and make energy use more efficient, improving transmission loss has therefore become an urgent issue.

#### (2) Development Policies for the Electric Power Sector in Sri Lanka and the Priority of the Project

The Ministry of Power and Energy stipulates energy efficiency as one of the most important policies, setting the target to reduce the transmission loss to 12% by 2016. To achieve this target, in the "Long-term Transmission Development Plan (2011-2020)," Ceylon Electricity Board (CEB) has analyzed issues of transmission lines based on the power demand forecast and long-term power generation development and formulated improvement plans according to the power system analysis. Towards power generation development plans in the future, it is critical to mitigate transmission loss and reinforce and improve the reliability of the power supply by introducing low loss transmission lines specifically in the long-distance transmission areas between Trincomalee (eastern coastal area) and the capital region. This project will build 220kV transmission lines using low-loss technology between Veyangoda and Habarana, which are key areas for power supply to Colombo. As this will expand the transmission capacity and improve transmission loss, the project is given high priority.

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

Japan's "Country Assistance Program for Sri Lanka (April, 2004)" states that Japan's aid policy is directed towards "institutional reform and assistance for the establishment of economic infrastructure." JICA in its Rolling Plan has set "improvement of power situations" as a development agenda. This project is in accordance with these policies.

To date, JICA has provided ODA loans to the power sector totaling 146.6 billion yen, including Vavuniya-Kilinochchi Transmission Line Project (I) and (II) (accumulated loan amount: 2.7 billion yen) in 2005 and 2010. In addition, as technical assistance, JICA has conducted projects such as "the Master Plan Study on the Development of Power Generation and Transmission System in Sri Lanka" (development study, 2004-2006) and "Project for Promoting on Energy Efficiency Improvement" (technical cooperation project, 2008-2011).

#### (4) Other Donors' Activities

Regarding energy efficiency in the power sector, the Asian Development Bank (ADB) is supporting the development of transmission lines and renewable energy across Sri Lanka. This project, however, will not

overlap with these efforts. Moreover, the power plant in Trincomalee, which is expected to utilize the main transmission lines constructed through this project, is supported by the Indian government.

(5) Necessity of the Project

This project is aimed at enhancing the transmission capacity and improving the transmission loss and reliability of the power supply by introducing new technologies that enable low-loss, large capacity transmission in long-distance transmission lines. The project is also in accordance with Sri Lanka's development policy and the assistance policy of Japan and JICA. Therefore, it is necessary and relevant for JICA to support this project.

### 3. Project Description

(1) Project Objectives:

This project is intended to strengthen transmission capacity, enhance the reliability of the power supply and improve transmission loss by constructing low loss transmission lines between Habarana and Veyangoda, thereby contributing to the economic development of Sri Lanka.

(2) Project Site/Target Area : North Central Province (Habarana), Central Province, North Western Province, Western Province (Veyangoda)

(3) Project Components:

- 1) Construction of 220kv transmission lines between Habarana and Veyangoda
- 2) Construction of New Habarana substation, augmentation of Veyangoda substation etc.
- 3) Consulting services (detailed design, tender assistance, construction management, etc.)

(4) Estimated Project Cost (Loan Amount):

11,277 million yen (Loan Amount : 9,573 million yen)

(5) Schedule:

February 2012 – September 2017 (Total of 68 months); the project will be complete when the facilities begin operation

(6) Project Implementation Structure:

- 1) Borrower : The Government of Democratic Socialist Republic of Sri Lanka
- 2) Executing Agency : Ministry of Power and Energy
- 3) Operation and Maintenance System: Ceylon Electricity Board (CEB)

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

1) Environmental and Social Considerations

①Category : B

②Reason for Categorization: Since this project does not include any of the sectors or attributes specified in the "JICA Guidelines for Environmental and Social Considerations" (established in April, 2010) that will tend to have an adverse impact or regions that will be easily affected, the project is considered to cause no significant harmful effect on the environment.

③Environmental Permit: Environmental Impact Assessment (EIA) is not required for this project under the law of the Democratic Socialist Republic of Sri Lanka.

④Anti-Pollution Measures: Necessary preventive measures will be taken to mitigate dust by sprinkling of water and fitting covers over trucks, and by appropriately managing vehicles and heavy equipment during construction.

⑤Natural Environment: The project site does not include regions that are easily affected such as a national parks and World Heritage Sites. However, the route of transmission lines passes through a part of the Forest Reserves (24 ha). As a countermeasure, CEB will pay compensation to the Forest Development to build a forest park equivalent to the size of the affected forest area.

⑥Social Environment: There will be no resident relocation or land acquisition. The project however

involves cutting down of 164 ha of commercial trees such as coconuts. CEB will pay compensation to the affected local residents based on the reacquisition price.

- ⑦ Other/Monitoring: The executing agency will monitor the level of air quality, noise, polluted water and waste products during construction.
- 2) Promotion of Poverty Reduction: Since the project site includes low-income areas, approximately 500 local staff will be employed during construction with a view to contributing to poverty reduction.
- 3) Promotion of Social Development : None in particular
- (8) Collaboration with Other Donors : None in particular
- (9) Other Important Issues: This project will apply low loss transmission technology developed by Japanese companies to improve power transmission loss, thereby contributing to climate change mitigation through the reduction of CO<sub>2</sub> emissions.

**4. Targeted Outcomes**

(1) Quantitative Effect

1) Operation and Effect Indicator

Indicators	Baseline (Actual value in 2011)	Target (2018) (Expected value 2 years after project completion)
Availability factor (%) :Transmission line	N/A	94
:Transformer	N/A	97
Electricity supply (GWh)	N/A	1,424
Planned Outage time (hours/year) :Transmission line	N/A	517
:Transformer	N/A	20
Forced Outage time (hours/year) : Transmission line	N/A	8.76
:Transformer	N/A	243
220kv New Habarana to Veyangoda Transmission loss reduction (GWh)	N/A	8.72

2) Internal rate of return

Based on the conditions below, the economic internal rate of return (EIRR) of the project will be 8.2%

Cost : Project cost (excluding tax), Operating and Maintenance Cost

Benefit : Economic cost reduction from lowered power loss (reduced fuel charge, etc.)

Project life: 30 years

(2) Qualitative Effect

Promotion of investment, economic and social development and climate change mitigation in Sri Lanka

**5. External Factors and Risk Control**

Climate condition (flood, etc.) and unexpected buried landmines and unexploded bombs

**6. Lessons Learned from Past Projects**

(1) Evaluation of similar projects: The ex-post evaluation of the Second 220kV Guddu-Sibbi-Quetta Transmission Project in Pakistan highlights an important lesson. Transmission lines between substations were constructed through the shortest possible route so as to reduce costs, resulting in construction of transmission lines far from the main roads. This made it difficult to conduct daily maintenance and access the project site and created demand for building access roads and maintenance stations.

(2) Lessons for the Project: In this project, a construction route will be selected with consideration of the maintenance of transmission lines

## **7. Plan for Future Evaluation**

- (1) Indicators to be used
  - 1) Availability factor (%)
  - 2) Electricity supply (GWh)
  - 3) Planned Outage time (hours/year)
  - 4) Forced Outage time (hours/year)
  - 5) 220kv New Habarana to Veyangoda Transmission loss reduction (GWh)
  - 6) Economic internal rate of return (EIRR) (%)
- (2) Timing of next evaluation: Two years after project completion