Japanese ODA Loan

Ex-Ante Evaluation

1. Name of the Project

Country: Kingdom of Cambodia
Project: Phnom Penh City Transmission and Distribution System Expansion Project
Loan Agreement: July 10, 2014
Loan Amount: 6,480 million yen
Borrower: The Royal Government of Cambodia

2. Background and Necessity of the Project

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

In recent years, the Cambodian economy has continued to show stable growth, driven by the sewing industry, tourism, and agriculture. With a GDP growth rate of 7.3% achieved in 2012, a high rate of growth is predicted to continue in the future as well. Along with this economic growth, the demand for electrical power has also rapidly increased. The volume of generated and imported electricity from 2002 to 2012 increased an average of 17.2% annually and the expansion of facilities in the power sector is a pressing issue. In particular, Phnom Penh is the social and economic center of the country; with a population of 1.5 million, it accounts for approximately 70% of the domestic electricity demand. The Electricité du Cambodge (EDC) has made ensuring the stable supply of power to this region its top priority. However, since the capacity of current transmission and distribution facilities has reached its limit, and a power control system has not yet been developed, the area affected by power outages is large and it takes a long time to restore power. In order to improve this situation, it is essential to reinforce transmission, substation and distribution facilities as quickly as possible.

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

In the Rectangular Strategy Phase Ⅲ formulated by the Government of Cambodia, electrical power development is designated as a priority area in infrastructure development, which is one of the four main pillars of the strategy. Additionally, in the National Strategic Development Plan (2009-2013), the electric power sector was designated as one of the priority issue fields. As part of this, the government will satisfy urban electrical power demands and develop transmission facilities in order to attain a stable supply of electricity.

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

In the County Assistance Policy for Cambodia formulated by Japan in April 2012, the Development of Economic Infrastructure has been designated as one of the Pillars of Priority. Since the Project prioritizes assistance to the development of stable electricity supply system which is a critical factor for attracting foreign direct investment, it is in line with Japan's assistance policy.

As for past assistance in the electric power sector, power grid transmission lines are currently under construction between Kampot and Sihanoukville as part of the yen-loan Greater

Mekong Power Network Development Project (March 2007-November 2014). Furthermore, a technical cooperation project entitled Project for Improvement of Transmission System Operation and Maintenance (January 2013-September 2015) is currently being implemented to improve the capacity of EDC for the operation and maintenance of substation and transmission systems.

(4) Other Donors' Activities

Through their Rural Electrification Fund (REF), the World Bank has provided rural electrification assistance for the Cambodian electric power sector. Additionally, ADB, Germany, and China, etc. have also provided rural electrification assistance by expanding the power grid.

(5) Necessity of the Project

The Project will stabilize the Cambodian power supply and improve access to electricity. Thus, since this is in line with the country's issues and development policies, JICA's support in implementing the Project is highly necessary and relevant.

3. Project Description

(1) Project Objective

By building new substations and expanding existing substations, installing transmission and distribution lines, and introducing power grid stabilization equipment for the capital city of Phnom Penh, the Project will increase the stability of the electricity supply in the metropolitan area, and thus contribute to the economic development of Cambodia.

(2) Project Site/Target Area

Phnom Penh City

(3) Project Components

1) Transmission and Distribution System Expansion (Building 115kV new transmission lines: 13.4km, Building 22kV new distribution lines: 19.6km, Building new data communications cable: 14.0km), construction of new substations and substation expansions (2 new, 2 expanded). (International Competitive Bidding)
2) Consulting services (basic design, tender assistance, construction management, etc.) (Short list method)

(4) Estimated Project Cost

8,645 million yen (including the yen loan of 6,480 million yen)

(5) Schedule

Scheduled from July 2014 to December 2018 (total of 54 months). Project completion is defined as the start of the actual operation (January 2018).

(6) Project Implementation Structure

1) Borrower: The Royal Government of Cambodia
2) Guarantor: None
3) Executing agency: Electricité du Cambodge (EDC)
4) Operation/Maintenance/Management: Electricité du Cambodge (EDC)

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

1) Environmental and Social Considerations

① Category: B

② Reason for the Categorization: Since this Project does not include any sectors or characteristics that are liable to cause adverse environmental impacts nor sensitive areas specified in the JICA Guidelines for Environmental and Social Considerations (published in April, 2010), it is unlikely that the Project will have severe negative impact on the environment.

③ Environmental Permit: An Initial Environmental Impact Assessment (IEIA) report concerning the Project was created and has been approved by the Ministry of Environment.

④ Anti-Pollution Measures: During construction, measures will be taken in regard to air quality and noise, etc. including spraying water to alleviate dust and using low-noise equipment and construction methods. Waste materials generated after handover will be appropriately processed by a waste management company. With this, adverse impact on the environment is planned to be minimal.

⑤ 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 environment will be minimal.

⑥ Social Environment: Since construction for the Project will be conducted within existing EDC power facilities and on government-owned land, no land acquisition or resettlement is necessary.

⑦ Other Aspects/Monitoring: During the construction period of the Project, a contractor will monitor air quality, noise, and water quality, etc. under the supervision of EDC. After handover, it is planned for EDC to monitor waste materials, etc.

2) Promotion of Poverty Reduction

None in particular

3) Promotion of Social Development (e.g. gender perspective, measures for infectious diseases including AIDS, participatory development, and considerations for persons with disabilities, etc.)

None in particular

(8) Collaboration with Other Schemes and Donors

Through the technical cooperation, Project for Improvement of Transmission System Operation and Maintenance (January 2013-September 2015), the capacity of EDC for the operation and maintenance of substation and transmission equipment is being strengthened. It is expected that the results of this will be utilized in the maintenance management of equipment installed for this Project.

(9) Other Important Issues

Since 2011, the number of Japanese companies expanding into Cambodia has increased greatly. Companies in the automobile parts, banking, and transport industries have continued

to move into the country. Since the offices of these Japanese companies are concentrated in Phnom Penh, a stable electricity supply will also contribute to supporting Japanese companies.

In addition, since transmission loss will be reduced through the Project, greenhouse gas emissions are projected to be reduced in the amount of 4,062t of CO^2 per year. (Next year after project completion)

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators

Indicators	Baseline (Actual value in 2012)	Target (2020) (Expected value 2 years after project completion)
Transformer availability factor (%)	-	76
Electricity supply (MWh/year)	-	1,170
Outage times of substation (times/year)	7	0
Transmission line availability factor (%)	-	67

2) Internal Rate of Return

Based on the following preconditions, the Economic Internal Rate of Return (EIRR) will be 16.84% and the Financial Internal Rate of Return (FIRR) will be 10.63%

EIRR

Cost: Project cost (excluding tax), operation and maintenance expenses

Benefit: Increased electrical power supply, improved supply reliability (reduction in power outage time), reduction of loss

Project life: 25 years

(2) Qualitative Effects: Stabilization of domestic power supply, promotion of investments, revitalization in industry, etc.

5. External Factors and Risk Control

Ahead of the Project, EDC is planning a project to build the Hun Sen Park substation and underground transmission lines between Hun Sen Park and GS2 using investment from a Chinese company (Build, Lease and Transfer methods). Since the transmission lines to be developed for the Project are planned to be connected to the Hun Sen Park substation, its construction progress and completion schedule will be checked regularly. In the case that delays, etc. are observed, steps will be taken to minimize the effects of this on the Project.

6. Lessons Learned from Past Projects

(1) Results of Evaluation of Similar Past Projects

From Ex-Post Evaluation results, etc. from the Power Distribution System Reinforcement Project in Thailand, it was learned that the need to enhance employees' technical skills is stronger when operation of the distribution system becomes more sophisticated. Therefore, based on distribution system automation, it is desirable to strengthen the capacity of employees to make better use of the infrastructure developed by the Project.

(2) Lessons for the Project

The introduction of equipment not yet used in Cambodia is also planned for this Project. Since further capacity building for employees is thus necessary, a technical cooperation project entitled Project for Improvement of Transmission System Operation and Maintenance was started in January 2013. With this, the capacity of EDC for the operation and maintenance of substation and transmission equipment is being enhanced.

7. Plan for Future Evaluation

(1) Indicators to be Used

1) Transformer availability factor (%)
2) Electricity supply (MWh/year)
3) Outage times of substation (times/year)
4) Transmission line availability factor (%)
5) Economic Internal Rate of Return (EIRR) (%)
6) Financial Internal Rate of Return (FIRR) (%)

(2) Time of Future Evaluation

Two years after project completion

END