

Ex-ante Evaluation

1. Name of the Project

Country: The Kingdom of Bhutan

Project: Rural Electrification Project

(Loan Agreement: May 9, 2007; Loan Amount: 3,576 million yen; Borrower: The Royal Government of Bhutan)

2. Necessity and Relevance of JBIC's Assistance

(1) Present State and Problems of the Electric Power Sector in Bhutan

With its abundant water resources, Bhutan has a power generation capacity (485 MW as of June 2006 and expected to increase to 1,505 MW in March 2007 when full operation of the Tala hydroelectric power plant is scheduled to start) by far exceeding the domestic power demand (128 MW as of June, 2006) and export of electric power to India is the main source of foreign exchange. However, as the electrification rate in rural households remains as low as 39% (as of 2005), an increase in the household electrification rate, particularly in rural areas, is necessary for poverty reduction.

(2) Rural Electrification Policy of Bhutan

Advocating the development philosophy called "Gross National Happiness (GNH)," the Government of Bhutan has been pursuing, without placing too much emphasis on economic growth expressed in GNP, the establishment of a fair and happy society. In a long-term vision "A Vision for Peace, Prosperity and Happiness" which was established in 1999 for the realization of the above-mentioned philosophy, rural electrification is identified as an important objective along with road construction from the viewpoint of reducing the disparity between urban and rural areas, reducing poverty, and promoting industries. The 9th Five-Year Plan (July 2002–June 2008) that was developed in line with the long-term vision sets the target of electrifying 100% of households by 2020 and the master plan for achieving a household electrification rate of 100% in rural areas was worked out by JICA in October, 2005. This project is to be implemented as part of the rural electrification plan drawn up by the Government of Bhutan under the 10th Five-Year Plan (July 2008-June 2013) and is based on JICA's master plan.

(3) JBIC's Policy and Past Activities of Assistance in Rural Electrification

JBIC's Medium-Term Strategy for Overseas Economic Cooperation Operations (established in April, 2005) mentions "poverty reduction" as one of the priority areas and sets out a policy of focusing on "assistance in geographical areas that are heavily inhabited by the poor" including infrastructure development in rural areas. Therefore, the assistance in this project is consistent with the above strategy.

(4) Necessity of the Project

In Bhutan, steep mountains dominate the terrain, and the electrification rate is particularly low in rural farming villages scattered throughout these mountainous areas where many poor people live. According to the result of a social survey conducted as part of JICA's master plan, the highest needs

by residents in rural areas is for an increase in the household electrification rate. In unelectrified areas, lack of access to electricity is a bottleneck to economic activities and improvement in the standard of living. Therefore, from the viewpoint of reducing regional disparity and supporting poor people, this project is highly necessary.

3. Project Objectives

This project aims to improve access to electricity of unelectrified households by developing power distribution networks in rural areas in Bhutan, thereby contributing to the improvement in the living environment of rural residents including the poor and promoting economic and social development in these areas.

4. Project Description

(1) Target Area

The whole area of Bhutan

(2) Project Outline

- (a) Construction and rehabilitation of power distribution networks (76 sites, total length: 2,390 km)
- (b) Consulting services (review of the detailed design, assistance in procurement, implementation supervision, etc.)

(3) Total Project Cost/Loan Amount

4,357 million yen (Yen Loan Amount: 3,576 million yen)

(4) Schedule

April 2007–December 2012 (69 months)

(5) Implementation Structure

- (a) Borrower: The Royal Government of Bhutan
- (b) Executing Agency: Department of Energy (DOE), Ministry of Trade and Industry
Actual procurement and construction will be implemented by Bhutan Power Corporation (BPC).
- (c) Operation and Maintenance System: BPC

(6) Environmental and Social Consideration

(a) Environmental Effects/Land Acquisition and Resident Relocation

(i) Category: B

(ii) Reason for Categorization

This project is not likely to have significant adverse impact on the environment under the “Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations” (established in April, 2002) in terms of its characteristics. Thus, this project is classified as Category B.

(iii) Environmental Permit

Under the legal system of Bhutan, whether or not an Environmental Impact Assessment (EIA) report is required is determined after the Initial Environmental Examination (IEE) is

conducted. If an EIA report is required, the executing agency and BPC will prepare it and apply for approval and authorization by the National Environmental Committee.

(iv) Anti-Pollution Measures

The contractor will take appropriate measures to mitigate pollution as necessary.

(v) Natural Environment

Some distribution lines will be installed through a nature reserve. However, the planned route is along the existing road and, if deforestation is needed, the range of deforestation will be minimized by the use of covered wire. Therefore, the project is not likely to have significant adverse impact on the natural environment.

(vi) Social Environment

Due consideration will be given so that installation of distribution lines will not affect the land use even when distribution lines run through private land. The project does not involve land acquisition, and utility poles are installed with the land owner's permission. The project will not require resident relocation.

(vii) Other/Monitoring

The executing agency and BPC will monitor the sediment discharge during the implementation of the project.

(b) Promotion of Poverty Reduction

The average income in unelectrified villages including the target area of this project (279 Ngultrum/month as of 2004) is far below the poverty line in Bhutan (740 Ngultrum/month as of 2004) and implementation of this project will help facilitate poverty reduction. When electrifying households, measures to disperse or reduce the burden of the initial connection fee on the poor people are planned to be taken including the introduction of an installment payment system and compensation for the initial fee for the residents who participated in the transport of material.

(c) Promotion of Social Development (e.g. Gender Perspective)

In remote areas, BPC is planning to provide the residents of the target villages with training on safe interior wiring so that they will be able to perform maintenance on wiring in the future.

(7) Other Important Issues

BPC is planning to encourage the residents of the target villages to subscribe to the electricity service and inform them of the level of subscription charges.

5. Outcome Targets

(1) Evaluation Indicators (Operation and Effect Indicator)

Indicator	Baseline (2006)	Target (2014, 2 years after completion)
Electrification rate of households in rural areas (%)	56.3 (Estimate for June, 2007)	83.9
(Number of households electrified by this project)	(0)	(15,322)
(Extent of contribution of this project (%))	(0)	(17.4)

Rate of service charge recovery (%)	95	95
Sales volume (GWh)	617	843

(2) Internal Rate of Return

Economic Internal Rate of Return (EIRR): 14.0%

- (a) Cost: Project cost (excluding tax), operation and maintenance expenses
- (b) Benefit: Increase in consumers' willingness to pay for electricity, effect of substituting existing energy sources (wood fuel, kerosene, etc.), increase in income from electricity sales
- (c) Project Life: 30 years

6. External Risk Factors

Increase in the project cost caused by a substantial rise in material prices and exchange fluctuations

7. Lessons Learned from Findings of Similar Projects Undertaken in the Past

In the post evaluations of past projects involving rural electrification, lessons were learned that in a project involving the building and expansion of a power distribution network, review of the plan at any time and flexible handling are necessary. In this project, a department dedicated to this project to be established in BPC and the management are planning to regularly check the progress of the project and discuss how to deal with problems if any.

Another lesson learned from rural electrification projects is that appropriate cost sharing is needed among the distributors, beneficiaries and the government with some consideration given to the poor. Including this issue, the progress of the reform of the electric power sector will be monitored periodically.

8. Plans for Future Evaluation

(1) Indicators for Future Evaluation

- (a) Electrification rate of households in rural areas (%)
- (b) Rate of service charge recovery (%)
- (c) Sales volume (GWh)
- (d) EIRR (%)

(2) Timing of Next Evaluation

After project completion