Bangladesh

Rural Electrification Project (Phase V-B)

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Field Survey: January 2009

1. Project Profile and Japan's ODA Loan

Map of the project area

Substation of Khulna PBS Headquarters

1.1 Background:

Bangladesh has been achieving real GDP growth of about 4-5% in recent years, and a power sector to support socioeconomic activities serves an important role in order to achieve continuous economic growth in the future as well. In particular, the electrification of rural areas where about 80% of the total population lives, and where the electrification rate remains at a very low rate of about 15%[1], has been one of the highly important issues in raising the level of the Bangladeshi economy and in reducing poverty. In 1977, the government of Bangladesh established the Rural Electrification Board (REB) to carry out rural electrification programs.

Japan has been supporting such rural electrification programs through ODA loan projects including the Rural Electrification Project (Phase IV-C) and the Distribution Network Expansion and Efficiency Improvement Project.

Against such a background, this project aims to electrify such rural areas by newly establishing electrification associations in areas under the control of the REB.

1.2 Objective:

By establishing Palli Bidyut Samity (PBS), an organization to promote the electrification of rural areas, by newly establishing and refurbishing the distribution networks, and by constructing substations in Khulna and Jhalakati located in the southwest part of Bangladesh,

[1] Based on the number of electrified households (as of 1996)

the project aims to electrify and improve the efficiency of facilities in the targeted area and to contribute in improving socioeconomic conditions and in developing the regional economy.

1.3 Borrower/Executing Agency:
Borrower: the Government of the People's Republic of Bangladesh
Executing Agency: Rural Electrification Board (REB)

1.4 Outline of the Loan Agreement:

Approved amount/ Disbursed amount	1,460 million yen/1,006 million yen
End notes exchange dates/Loan Agreement Signing Date	August, 2000/March, 2001
Terms and Conditions	Interest rate: 1% Repayment period: 30 years (Grace period: 10 years) Procurement: General untied, etc.
Final Disbursement Date	February 2006
Main Contractor (Over 1 billion yen)	N/A
Main Consultant (Over 100 million yen)	N/A
Feasibility Studies, etc.	

2. Evaluation Results (rating: B)

2.1 Relevance (rating: a)

2.1.1 Relevance at Appraisal

In the Fifth Five-Year Plan (1997-2002), promoting rural electrification was one of four prioritized policies in the national power sector. The amount of public investment allocated to the power sector reached the equivalent of 10% of the entire plan. Four prioritized policies in the power sector were named in this plan, and the expansion of rural electrification was one of them.

At that time, the electrification rate in the rural areas of Bangladesh, including the targeted areas of this project, remained at a very low level of around 15%. Therefore, it was necessary to promote electrification for rural areas wherein about 80% of the total population resides. In addition, because the system loss rate was very high at about 35% even in the already electrified areas, measures to prevent power theft and to rehabilitate and reinforce old facilities were important issues.

The necessity of the project, which electrifies 50,000 households and improves efficiency of the system, was also high.

2.1.2 Relevance at Ex-Post Evaluation

In "Vision 2021" announced by the current Awami League administration, reform of the power and energy sectors and poverty reduction are the two of five prioritized areas. Agriculture and rural development is also one of the 23 prioritized areas, and it still has high significance. National energy policy formulated in 1995 is still regarded as the basic guideline that embodies the power sector policies, and rural electrification by REB/PBS is continuously positioned as one of the important components of the policy. The Bangladeshi government had been carrying out rural electrification projects based on support from international aid agencies including those in Japan, and through such projects, the electrification rate improved from 15% at the time the project was begun to over 30% at the time of evaluation. However, the electrification rate still needs to be improved.

In view of the above, this project has been highly relevant with Bangladesh's national policies and development needs at the times of both appraisal and ex-post evaluation.

2.2 Efficiency (rating: b)

2.2.1 Project Outputs

The plan and actual results of this project are shown in the table below.

Table 1 Outputs; Comparison of Plan at the Time of Appraisal and Actual

Outputs	Original	Actual
(1) Rural electrification projects		
1) Establishment of PBS		
Khulna, Jhalakati	Two newly established	Same as planned
	1,850km in total	
2) Construction/rehabilitation of		2,099km in total
distribution network	1,090km	
Khulna	867km	1,243km
Jhalakati		856km
3) Substations (33/11kV)	4 locations in total	4 locations in total
Khulna	2 newly constructed	2 newly constructed
Jhalakati	2 rehabilitated	2 rehabilitated

4) Number of households electrified Khulna Jhalakati	79,017 in total 50,454 households 28,563 households	102,960 in total 64,408 households 38,552 households

The project scope developed generally as planned. PBSs are individually carrying out the laying out of distribution networks on their own even after the completion of the project, and the number of electrified households grew to almost double the number at the time of appraisal to about 100,000 households. However, in the last two years, the laying down of new distribution lines stopped due to power supply shortages. In addition, because the transmission of the existing distribution network held by the Bangladesh Power Development Board (BPDB) to REB[2] is not progressing, both the total extension of the distribution network and the number of connections have not been increasing recently.

Figure 1 Substation of PBS Headquarters

Figure 2 Distribution Network Developed under the Project

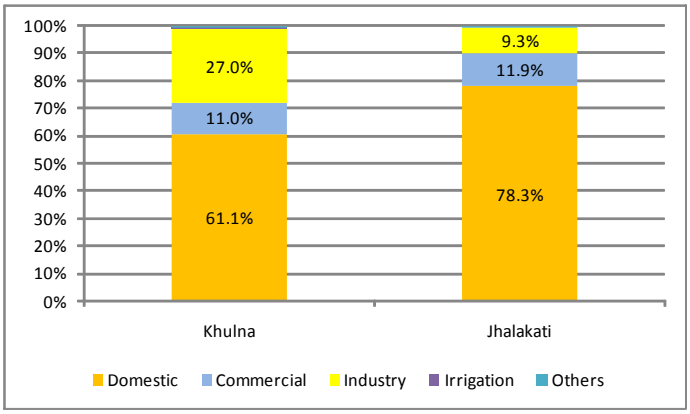
The composition of the consumers for each PBS is shown in Figure 3 below. In particular, in Jhalakati, about 80% of the customers are general households. As can be seen in Table 2, electric utility charges for these general households are set at a very low rate. This is because the charges for large customers and industrial uses are set at a higher level for political reasons to promote the diffusion of rural electrification and because of the nature of rural electrification as a social project. Therefore, it cannot be helped that the profitability of a PBS with such a large share of general households as Jhalakati is low.

In addition, as for both PBSs, the distribution networks for areas with strong demand such as commercial districts are still possessed by the BPDB, and transmission is not progressing,

[2] At the time of the establishment of REB, the roles were divided among the relevant institutions in the power sector. Rural electrification had then come under the charge of REB, and it is required by law that the existing distribution network in the area under the control of REB also be transmitted to REB. However, according to the relevant parties of REB, in reality, BPDB is not willingly offering cooperation for the transmission, and there are still areas to which electricity is distributed by BPDB (pocket areas) within the areas of which REB should have charge.

which is also affecting profitability. This situation is linked with the financial tasks of PBS as described in detail in 2.5 Feasibility hereafter.

Figure 3 Composition of Customers (based on power consumption)



出所：REB

Source: REB

Table 2 Electricity Rate Table of PBS

(Unit: BDT/kWh)

Type		Khulna	Jhalakati
Domestic	~100kwh	2.55	2.81
	101~301	2.75	2.86
	301~500	3.9	4.06
	501~	5.4	5.9
Commerical		5.11	5.11
Public utility		3.28	3.28
Irrigation		2.75	2.87
Small/Mid industry		3.95	4.01
Large industry		3.8	3.91
Street light		3.75	3.75

出所：REB

2.2.2 Project Period

While the scheduled period of the project was from March 2001 to June 2004 (40 months), the actual period was from March 2001 to June 2005 (52 months), which was longer than planned. The reason for the extension was the late start of procurement procedures mainly due to delays in procedures within the government. According to the interview with the REB, it was pointed out that the major reason were delays in project design and approval of procurement within the government as well as delayed funding supply from Bangladesh Bank. The period of the construction itself was generally within the schedule.

2.2.3 Project Cost

Against the scheduled total project cost of 2.915 billion yen, the actual cost was 2.952 billion yen, which was slightly higher than planned. While the project scope was scaled down with one substation being removed from the project, there was an increase in general administration costs due to an increase in the price of materials and the extension of the project period, which resulted in the marginal increase of the total project cost as a whole.

Therefore, although the project cost was slightly higher than planned, the project period was longer than planned, therefore the evaluation for efficiency is moderate.

2.3 Effectiveness (rating: a)

2.3.1 State of the operation of each PBS

(1) Khulna

The electrification rate reached the targeted figure of 30%, and the number of electrified households is also increasing steadily. Other major indicators, including the amount of electricity sales, are exceeding the initial plan by far. Thus, it can be evaluated that the project objective is being achieved favorably. In particular, indicators such as system loss and charge collection, which is used as evaluation standards of PBS management, have achieved the planned figures, supporting the management capability of PBS. In addition, operational indicators regarding the duration of outage either generally achieved or approximately reached the planned levels at the time of appraisal, the average figure of whole PBSs and the targeted figure by REB[3], showing high effectiveness. However, new construction has ceased since 2007 due to a shortage in the electricity supply, resulting in the slowdown of the growth of the number of electrified households.

Table 3 Operational Status of Khulna PBS

Indicator (unit)	2000	Target (2005)	2007	2008
No. of electrified villages (out of 841 villages)			-	389
No. of electrified households (no. of connections)	12,854	50,454	62,608	64,408
Electrification rate (Total no. of households: 194,000)	7.8%	30%	32.3%	33.19%
Peak Load (kw)	-	-	14,096	16,850
Forced Outage Hours	-	30	13.63	60.24
System loss (%)	46%	18%	16.0%	13.81%
Amount of electricity supply (mwh)	-	-	49,561	57,744
Amount of electricity sales (mwh)	-	-	41,630	49,145
Charge collection rate (%)	-	96%	101.78%	98.95%

Source: Khulna PBS/REB

(2) Jhalakati

Similarly to Khulna, electrification rate reached the target of 30%, and the number of

[3] REB introduced an original evaluation system called the Performance Target Assessment and is setting targets for several operational indicators. (See 2.5 Feasibility.)

households connected increased significantly compared to before the implementation of the project, showing results that exceeded the planned levels. Thus, it can be evaluated that the project objective was favorably achieved. Important operational indicators such as system loss and the charge collection rate also exceeded the planned levels at the time of appraisal, which verifies the high management capabilities of PBS. While system loss for FY2008 deteriorated because of the cyclone that occurred in winter 2007, it still reached the planned levels. According to the person in charge, after the restoration, the figure has been recovering to the levels from before the disaster.

Table 4 Operational Status of Jhalakati PBS

Indicator (unit)	2000	Target (2005)	2007	2008
No. of electrified villages (out of 451 villages)			-	297
No. of electrified households (no. of connections)	9,100	28,563	37,255	38,552
Electrification rate (Total no. of households: 126,000)	7.2%	23%	29%	30%
Peak Load (kw)	-	-	1,900	1,800
Forced Outage Hours	-	30	16.3	17.31
System loss (%)	46%	18%	13.59%	15.51%
Amount of electricity supply (mwh)	-	-	14,334	13,262
Amount of electricity sales (mwh)	-	-	12,387	11,408
Charge collection rate (%)	-	96%	100.77%	99.23%

Source: Jhalakati PBS/REB

Shortages in the electricity supply (from BPDB) can be pointed out as an issue common to both PBSs. This is an issue of the whole Bangladesh power sector, which is an external factor beyond the scope of the project. However, when supply shortages occur, power supply to large cities such as Dhaka is sometimes prioritized, which significantly affects electricity supply to rural areas. Actually, both PBSs stopped the construction of new distribution lines since 2007 due to shortages in the electricity supply, resulting in the slowing down of growth in the number of electrified households. There are also situations occurring that may affect the project effectiveness, such as a decrease in the amount of electricity sales due to load shedding.

Reference: Outline of the Bangladeshi Power Sector

Reinforcement of power generation capacity hardly progressed during the former administration. In addition, the closing of old power plants occurred at the same time. Due to these reasons, shortages in the electricity supply are currently a serious problem in Bangladesh. Therefore, supply disruption at the peak time of demand is occurring frequently in the project target area, affecting the effectiveness of the project.

Table 5 Outline of the Bangladeshi Power Sector

(Unit: MW)

	2005	2008
Installed capacity	5,025	5,275
Public (BPDB)	3,735	3,985
Private (IPP)	1,290	1,290
Generation capacity	4,030	3,782
Peak demand	3,751	5,500
Supply-demand gap	279	(1,718)

Source: BPDB

Although this is a problem due to an external factor that is beyond the scope of the project design, adequate power generation capacity is the premise for ensuring the sustainable effects of rural electrification (electricity distribution project). Therefore, it is necessary to reinforce power generation capacity as soon as possible.

2.3.2 Results of Economic Internal Rate of Return

As for the calculation of the EIRR of this project, the increase in electricity consumption as a result of electrification[4] and effects such as saving fuel costs (Kerosine)[5] are converted into economic benefits, and the initial investment and maintenance and operation costs are calculated as economic costs. The result is as follows.

Table 6 Recalculation of Economic Internal Rate of Return (EIRR)

	Original EIRR	Recalculated EIRR
Khulna	9.12%*	12.92%
Jhalakati		17.12%

*Note: EIRR at the time of appraisal is the total value of the Rural Electrification Project implemented at the same period (Phase V-B).

[4] Price of electricity per unit for general households is set at a low level for political reasons. Because this is inadequate for the calculation of the economic price, 5.11BDT/kwh, which is the price for commercial districts, was used by converting into the price at national level.

[5] The effects of fuel cost saving are calculated as the difference between the estimated kerosene consumption before and after the implementation of the project, calculated as a benefit, based on the result of a sample survey among beneficiaries (see 2.4 Impact for details).

Although it is difficult to make a simple comparison of EIRR because original EIRR is the total figure including other PBS, both PBS scored figures above the average of the total PBS. A possible reason for this is the increase in consumption of electricity due to the constant growth of connections after the completion of the project.

By summarizing the effectiveness of the project from the results explained above, such as the steady increase in the number of electrified household and electrification rate achieved by the project and the favorable operational status of PBS, the project effects are confirmed to be generally as planned. Therefore, this project has largely produced the planned effects, and its effectiveness is high.

2.4 Impact

2.4.1 Improvement in living conditions

The overall goal of this project was to contribute to the development of socioeconomic conditions in the targeted area and in regional economic development through electrification. In order to confirm the socioeconomic impact of this project in the targeted area, beneficiary survey was conducted to approximately 200 households under each PBS. The major results of the survey are as follows.[6]

The total degree of satisfaction was high for both PBSs, and the contribution of electrification to changes and improvement in living conditions is generally recognized. On the other hand, complaints about the recent interruptions of power feed are increasing, which is also affecting the degree of satisfaction.

Figure 4 Degree of Satisfaction after Electrification

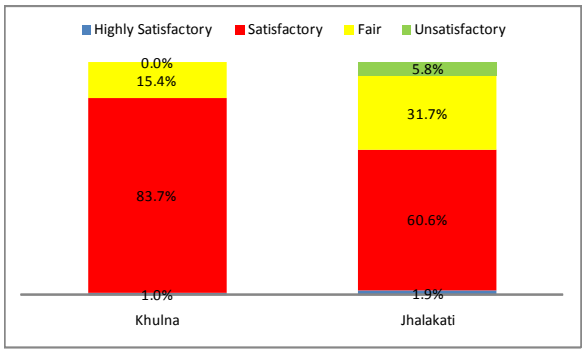
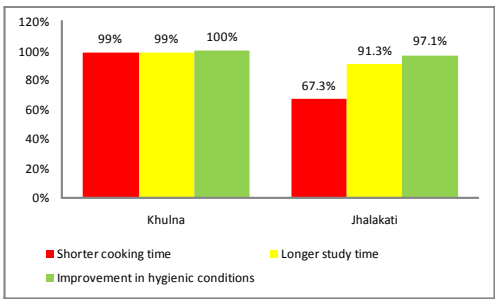


Figure 5 Improvement on living condition after electrification



[6] The survey was implemented in a face-to-face interview format using questionnaire form. The number of samples was 104 each per PBS, 208 in total.

The largest difference derived from electrification was the improvement in living conditions. The survey asked about improvements in major housekeeping and study hours, and the results showed that the opinions acknowledged improvements for most items. Especially in Khulna, almost all respondents acknowledged improvements, showing the extent of the effects of electrification. In specific, many pointed out the shorter time required for housework, especially cooking, the increase in studying hours of children, increased comfort by use of TV and electric appliances (electric fan, refrigerator, etc.), acquisition of information and knowledge (and improvement in hygienic conditions based on the information/knowledge), and improvement in public safety at night. In the village visited in the field survey, about 60-70% of residents possess a TV, and there were many of them acknowledged the indirect effects of electrification such as progress in raising awareness in their daily lives by watching health programs on TV.

On the other hand, most complaints with the status quo were related to the frequent stoppage of power feedings. There is particularly strong dissatisfaction towards power feed interruptions that occur during the evening and night hours, when electricity demand is at its peak. As explained before, although this is a problem due to an external factor that is beyond the scope of the project design, almost all respondents answered that there are power feed interruptions nearly every day. The results show that the average length of power feed interruptions is 3-4 hours at the peak time.

Figure 6 Scene from the Beneficiaries Survey

Figure 7 Household with TV

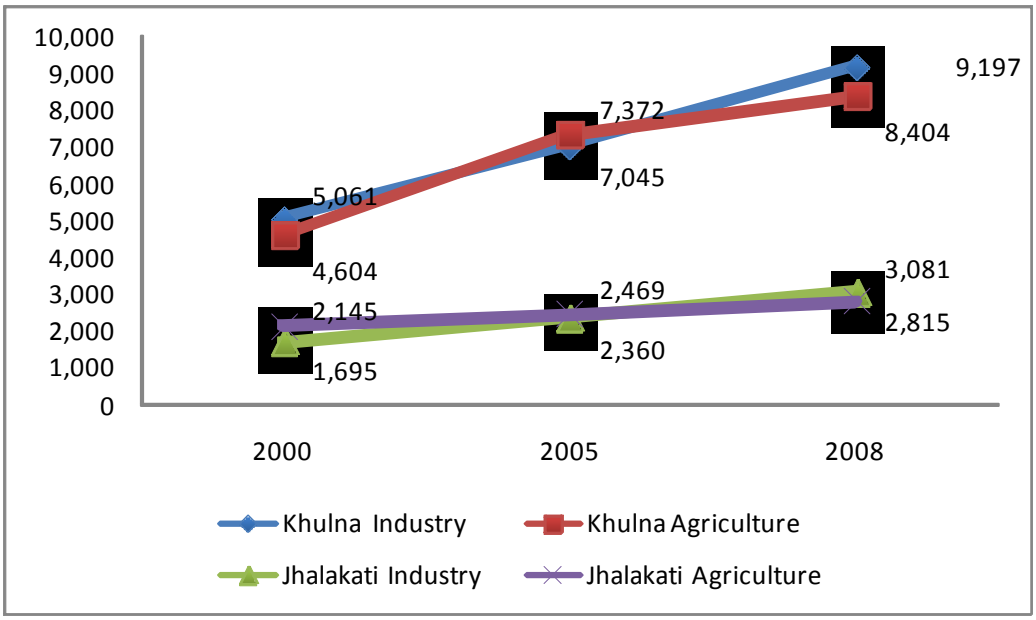
2.4.2 Improvement in economic conditions

The figure below shows the growth in GRDP of industry and agriculture in targeted areas. Compared to the levels of 2000, before the electrification, the figures show an increase of about 30-80%. According to the PBSs, electric irrigation pumps are currently in operation in about 900 locations, allowing rice production equivalent to about 7,500 tons in the dry season. In order to verify the impact of electrification in these economic activities, changes in the income and economic conditions of the respondents were confirmed through a questionnaire survey. In

addition, stores and small-scale factories in several locations were visited during the field survey, where interviews were held.

Figure 8 Changes in Gross Production within the Area (2000-2008)

(Unit: million BDT)



Source: REB

As for changes in income confirmed in the questionnaire survey, opinions representing an increase are at around 40% in both areas, or at about 35% in Khulna and about 45% in Jhalakati. Because these areas are vulnerable to flood damages and have disadvantageous geographical conditions, there was historically less industry activity compared to other regions. Therefore, these areas are not in a situation wherein dramatic changes in economic conditions would be caused immediately by the electrification. However, according to the field interview survey, the opinion that electrification had triggered the vitalization of economic activities was evident, suggesting that a certain level of impact is emerging. Also, the consumption of kerosene, a lamp fuel used in the past, is showing a notable decrease. Reduction in fuel costs and the usage of fossil fuels being held down can also be recognized as secondary effects of the project[7].

[7] These results were obtained under the current situation, in which power outages are frequent. It is expected that the effect will increase further once a stable power supply has been ensured.

Figure 9 Changes in Income Before and After Electrification

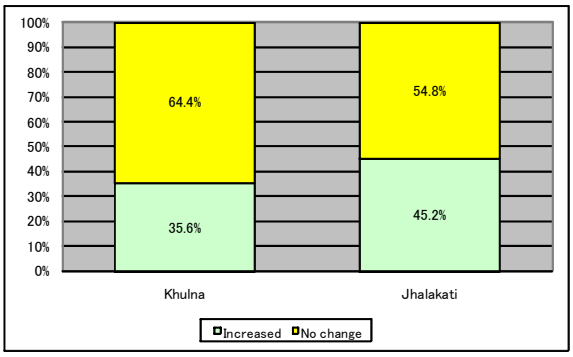
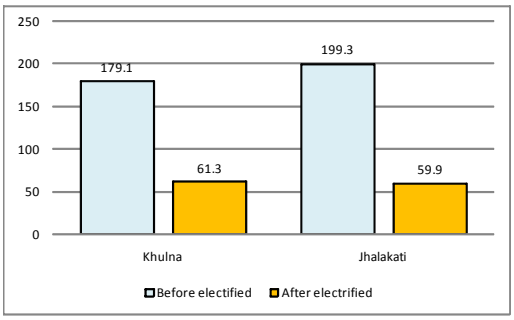


Figure 10 Comparison of Average Consumption of Kerosene

(Unit: BDT)



As for specific examples of the vitalization of economic activities caused by the electrification, the results of an interview survey implemented in Khulna show examples such as the creation of new industries including shrimp culture and lumbering made available by electrification, improvement in agricultural productivity by the use of irrigation, and extension in the business hours of stores. An interview survey of staff working in these plants and stores also revealed the fact that there had been many workers migrating out to different areas until the electrification. From these reasons, the project is considered as contributing, to a certain extent, to the creation of employment opportunities in rural areas and consequently in encouraging the permanent settlement of residents in the area.

2.4.3 Impacts on the environment, resident relocation and land acquisition

The impacts of the project on natural environment were approved by the Department of Environment at the time of appraisal, and there were no particular problems reported upon the implementation of the project. Although problems regarding the acquisition of lands for the candidate sites of PBS headquarters and substations occurred, these lands were all acquired before the implementation of the project. There was no resettlement of residents due to the implementation of the project.

Figure 11 Shrimp Culture Plant that Started Business after Electrification

Figure 12 Mechanized Lumber Mill

Because most of the customers of both PBSs are general households and the scale of power supply for industrial use is still relatively limited, it is difficult to quantitatively measure the degree of the contribution of the electrification in economic development in the targeted areas. However, in the field survey, many beneficiaries expressed opinions implying that the increase in economic activities had been brought on by the electrification. The electrification is therefore considered to be making a certain contribution in improving economic conditions in the area, such as the vitalization of local industry and the creation of employment opportunities.

2.5 Sustainability (rating: B)

2.5.1 Executing agency

2.5.1.1 Structural aspects of Operation and Maintenance

The systems of the REB and PBS were unchanged from the time of appraisal. Members of the management boards selected from among the residents serve as the decision-making body regarding the management of PBS, and the General Manager appointed by the REB is mainly in charge of the practical business of management. The REB is deeply engaged in the management of PBS, and offers active support through measures such as management and technical training. The organization and the systems are operating stably, and there were no complaints or problem with the current system, including personnel matters, raised by either PBS.

Table 7 Number of Staff at Each PBS

	Khulna	Jhalakati
Operation/maintenance	90	44
Accounting	137	76
Customer service	10	7
General affairs	33	16
Total	270	143

Source: Khulna PBS and Jhalakati PBS

Engineers of each PBS are in charge of daily maintenance. The staff consists of full-time staff and locally-employed seasonal employee. Women are actively employed in office work such as accounting, and majority of the accounting division staff is female.

Figure 13 Repairing a Plant within PBS Headquarters

Figure 14 Female Staff Engaged in Office Work

2.5.1.2 Technical aspects of Operation and Maintenance

Maintenance of transformers and distribution lines, as well as the adjustment of the precision of meters, are all handled by the maintenance division of PBS. Both PBSs are capable of doing all of these on their own, and there were no technical problems found. Although some maintenance is done by seasonal employees under the instruction of the engineers, a system to assign and foster staff with the appropriate technical level is being established, such as by classifying the employees into three occupational ability levels according to their individual degrees of proficiency.

Employees of the REB and PBS are required to take certain training courses according to their working years and position at the organization. They receive this training on a regular basis, usually in the form of on-the-job training. The training program is rich in its content, covering all services of PBS, including training for managerial staff, and training for the accounting/finance and technical divisions, and they also accept trainees from abroad.

Table 8 Implementation of Training at the REB

Year	No. of courses	No. of trainees	Training hours
2005	281	5,973	22,253
2006	339	7,785	35,091

Source: REB

2.5.1.3 Financial aspects of Operation and Maintenance

(1) Financial status of the REB

Most of the income of the REB is in interest payments from PBS. The annual balance of payments has shown steady results so far. The capital adequacy ratio on the balance sheet is as high as 63-64%, and the majority of such capital comes from government funds. Government capital is injected in the REB. Because the importance of rural electrification in government policy is unchanged, it is expected that no serious concern in financial sustainability will arise as long as the financial situation of the REB is stable. However, it is thought that the current deterioration of the financial status of PBS will affect the financial status of the REB, which depends heavily on interest payments from PBS for its income. Already, the majority of new investments rely on funds from donors abroad, so the further deterioration of financial status may become an obstacle to the expansion of the rural electrification project in the long term. Therefore, it is expected that countermeasures to improve the balance of PBS will be necessary.

Table 9 Profit and Loss Statement (REB)

(Unit: million BDT)

	2006	2007
Total income	1,957,107	2,355,215
Interest payments from PBS	1,891,766	2,131,579
Other income	65,341	223,636
Total costs	276,363	433,145
Ordinary profit	1,680,744	1,922,070
Income payments	462,363	492,247
Net profit	1,218,381	1,429,823

Source: REB *Based on financial year of Bangladesh (from July to June)

(2) Business conditions of PBS

Business conditions of each PBS are as follows. They have recorded losses each year.

Table 10 Profit and Loss Statement of Each PBS

(Unit: BDT)

Khulna	2006	2007
Total income	94,738,580	114,967,613
Total costs	108,517,558	133,253,716
Ordinary profit	**(13,778,978)**	**(18,286,103)**
Jhalakati	2006	2007
Total income	58,954,933	47,460,424
Total costs	89,638,198	93,169,757
Ordinary profit	**(30,683,265)**	**(45,709,333)**

Source: Khulna PBS and Jhalakati PBS

A breakdown of the cost per Kwh is as shown below. The operating expenses of Jhalakati are notably large. This is considered to be because of the large maintenance costs due to geographic conditions that are vulnerable to flood, the small scale of business, and structural difficulties in securing profitability due to the composition of customers. On top of this, although the sales price of electricity is already set at a low price[8], the wholesale price of electricity from PDB was raised in November 2008, resulting in a further deterioration in profitability.

As for the maintenance budget, personnel in charge at each PBS answered that an adequately sized budget has been secured so far and that there are no serious problems occurring. Judging also from the condition of the maintained spare parts and the implementation of maintenance as described below, there seem to be no major problems at present. However, countermeasures should be taken against the continuous deterioration of PBS's financial status, since it may cause a negative effect on the sustainability of the project in the future. The table below summarizes indicators relating to the profitability of both PBSs, such as costs and earnings per unit. It shows that costs are exceeding earnings for all indicators.

[8] See 2.2.1, Table 2 Electricity Rate Table of PBS

Table 11 Profitability of each PBS

(Unit: BDT)

	Khulna	Jhalakati	Average of all PBSs
Profit per Kwh	**(0.45)**	**(4.01)**	**(0.07)**
Revenue per Kwh	3.98	4.16	3.77
Costs per Kwh	4.43	8.17	3.84
(Electricity sales)	2.41	2.44	2.56
(O&M costs)	1.00	**2.20**	0.57
(Depreciation)	0.67	1.93	0.44
(Interest payments)	0.35	1.60	0.27

Source: REB

The problem of the financial standing of PBS is a common issue to PBSs throughout the country and not only limited to both PBSs under the project. According to the REB, among 70 PBSs in total, there are only 18 that are making a profit, pointing out the necessity of improvement in profitability. Therefore, in January 2009, the REB filed an application with the Bangladesh Energy Regulatory Commission for an increase in the sale price of electricity which is currently going through the screening process. However, because the new administration will refrain from such a price hike for six months, it is expected that the price hike will only be realized after a certain period, even if the application is approved.

2.5.2 Current status of Operation and Maintenance

(1) Performance Evaluation System of PBS

Each PBS has introduced a performance-based personnel system called PTA (Performance Target Measurement)[9]. Business is operated under a system wherein an achievement goal regarding the implementation of the project is reached every year with the REB, and salaries are decided according to the achievement level.

In the case of Khulna, according to PTA indicators for FY2007, 13 items out of 21 were achieved. Although the target figure for system loss, which is considered to be particularly important, was achieved, the period for collecting the accounts receivable was 1.42 months, exceeding the target level of 1.3 months. However, most figures reached a level similar to the target even when the target itself was not achieved. Therefore, overall performance can be evaluated as being favorable.

[9] PTA indicators are comprised of about 20 indicators including system loss, charge collection rate, and the condition of maintenance, and each item is weighed according to its level of importance. These indicators are counted every year and an evaluation is made according to the overall level of achievement.

(2) Khulna

No problems were found either in the substations or the distribution lines, and they are being maintained in good condition. The support desk handles any problems that occur and keeps records on how each problem was handled. The actual records were checked during the field survey, and they showed that the response speed was generally fast and that the follow-up was adequate.

Most consumable supplies such as meters and spare parts can be procured domestically, and a stock is kept within PBS headquarters. Mechanics employed by PBS are in charge of the maintenance of facilities such as regular check-ups of transformer coils, and maintenance is carried out adequately without external support.

(3) Jhalakati

In 2007, a cyclone of historic proportions caused damage such as collapsed transmission lines and poles. However, the function of the system has been restored and there are currently no problems in both the substations and the distribution lines. The response system for cases of trouble has also been established. However, some of the beneficiaries expressed dissatisfaction such as the late response time of the follow-up service when trouble occurred. Similar to Khulna, there were no problems found in the condition of spare parts that were maintained.

Based on the above results, it is evaluated that the capabilities of the executing agency are high and the operation and maintenance system has continued in stable condition. Though some problems have been observed in terms of financial condition of PBS, sustainability of this project is fair.

3. Conclusion, Lessons Learned and Recommendations

3.1 Conclusion

The project has produced stable outcome in terms of the improvement of socioeconomic conditions through rural electrification, which was the objective of the project. The management of PBS is also favorable, and the current outcome can be sustained in the future.

In light of the above, this project is evaluated satisfactory.

3.2 Lessons Learned

N/A

3.3 Recommendations

(For the executing agency)

Although the original objective, namely, rural electrification through the establishment of PBS, is being achieved smoothly, there are concerns that the problems in the whole power sector may affect the sustainable outcome of the project in the future. The entire power sector should address the following problems in the future:

1) Shortening of the load shedding by ensuring supply capabilities through the development of new power sources.
2) Review of procurement costs (or electricity sales prices), an increase of connections by encouraging the transfer of PDB-owned facilities, and improvement of profitability by ensuring bulk users in industry and commercial sectors.

Comparison of Planned and Actual Scope

Item	Original	Actual
(1) Project Outputs		
1) Establishment of PBS	Two locations	As planned
Khulna	New establishment	As planned
Jhalakati	New establishment	As planned
2) Construction/ rehabilitation of distribution network	Total extension: 1,850km	Total extension: 2,099km
Khulna	1,090km	1,243km
Jhalakati	867km	856km
3) Construction of substations	(33/11kv substations) Total Five locations	(33/11kv substations) Total Four locations
Khulna	Three newly constructed	Two newly constructed
Jhalakati	Two renovated	Same as planned
4) Electrified households	Total 53,000 households	Total 102,960 households
Khulna	37,628 households	64,408 households
Jhalakati	19,463 households	38,552 households
(2) Project Period	March 2001 – June 2004 (40 months)	March 2001 – June 2005 (52 months)
(3) Project Cost		
Foreign currency	1.460 billion yen	993 million yen
Local currency	1.455 billion yen (674 million BDT)	1,959 million yen (1.015 billion BDT)
Total	2.915 billion yen	2.952 billion yen
Japanese ODA loan portion	1.460 billion yen	1.066 billion yen
Exchange rate	1 BDT = 2.16 yen 1 dollar = 110 yen (as of May 2000)	1 BDT = 1.93 yen 1 dollar =116.6 yen (average during January 2001 – December 2006)