Sri Lanka

Ex-Post Evaluation of Japanese ODA Loan Project

"Medium Voltage Distribution Network Reinforcement Project"

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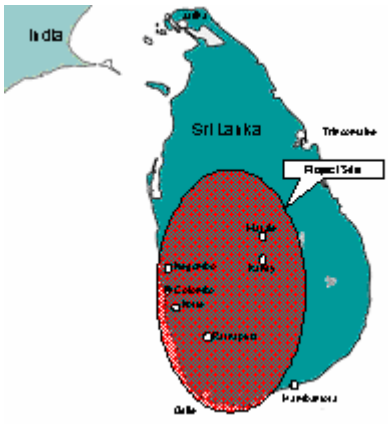
Field Survey: October 2008

1. Project Profile and Japan's ODA Loan



Map of the project area

Ganemulla Switchyard (gantry)

1.1 Background:

As a result of continued gradual expansion, Sri Lanka's medium-voltage distribution is currently supplying electricity through a dendritic system. This has led to problems including capacity shortage, voltage reduction and high rates of distribution loss. In order to improve this situation and meet electricity demand, which was expected to increase, the Ceylon Electricity Board (CEB) formulated the Medium-Voltage Distribution Development Plan 1995-2005, a basic plan for the nation-wide development of a medium-voltage electricity grid, based on power demand projection data for the next decade collected from each province. The plan proposed the construction of express lines and the installation of switchyards (gantries) as a method to reinforce the dendritic distribution network with the best investment efficiency, and selected highly urgent projects on a nationwide scale. In order to ensure a stable supply of electricity in Sri Lanka, it was necessary to implement the plan as soon as possible.

1.2 Objective:

The objective of this project is to ensure a stable supply of electricity through the reinforcement of system capacity, the reduction of loss and the improvement of the quality of electricity distribution (voltage) by constructing express lines and switchboards

within the medium-voltage (33kV) distribution network in Sri Lanka, and thereby contribute to the economic development of Sri Lanka and the improvement of the living environment of residents.

1.3 Borrower/Executing Agency:
Borrower: Government of the Democratic Socialist Republic of Sri Lanka
Executing agency: Ceylon Electricity Board (CEB)

1.4 Outline of Loan Agreement:

Approved Amount/ Disbursed Amount	5,973 million yen / 3,411 million yen
End Notes Exchange Date / Loan Agreement Signing Date	August 1998 / September 1998
Terms and Conditions	Interest rate: 1.8%, and 0.75% for the consulting service Repayment period: 30 years (Grace period :10 years), and 40 years for the consulting service (Grace period:10 years) Procurement: General untied (Bilateral untied for the consulting service)
Final Disbursement Date	June, 2005
Main Contractor (Over 1 billion yen)	Hyundai Engineering & Construction Co., Ltd.
Main Consultant (Over 100 million yen)	Tokyo Electric Power Services Co., Ltd., J-POWER, FICHTNER GMBH & COMP
Feasibility Studies, etc.	Government of Sri Lanka: Medium Voltage Distribution Development Plan 1995-2005

2. Evaluation Results (rating: B)

2.1 Relevance (rating: a)

This project has been highly relevant with Sri Lanka's national policies and development needs at the times of both appraisal and ex-post evaluation.

2.1.1 Relevance at Appraisal

In terms of policies and measures, the stabilization of the electricity supply is an important issue from the perspective of the improvement of the investment environment

in order to encourage the active inflow of foreign capital, which was mentioned in the Public Investment Plan (1993-1997) of Sri Lanka. Consequently, at this time, 8% of the total budget was allocated to the electricity and energy sector.

As a result of continued patchy expansion, Sri Lanka's medium-voltage distribution is currently supplying electricity through a dendritic system, which is causing problems including capacity shortage, voltage reduction and high rates of distribution loss. Therefore, the Medium Voltage Distribution Development Plan proposed the construction of express lines and the installation of switchyards (gantries) in order to reinforce the dendritic distribution network in a highly efficient manner.

In addition, the location of the express lines and switchyards, which are the target of this project, were selected using the distribution system analysis program developed in the U.S. Setting the express lines and switchyards was a highly urgent issue which required completion by 2000.

2.1.2 Relevance at Ex-post Evaluation

At the time of evaluation, eight important issues in the energy sector had been selected in the Mahinda Chinthana: Vision for a New Sri Lanka (establishment of framework for 2006-2016), in terms of policies and measures. Within these issues, there are two items related to this project, namely the dissemination of electricity and the development of an electricity transmission and distribution network. Especially regarding the development of an electricity transmission and distribution network, it points out that investment in the electricity transmission and distribution network is delayed or insufficient and mentions the necessity of the development of a network. According to the National Energy Policy & Strategies of Sri Lanka, announced in May 2008, improvement of the electricity transmission and distribution network is essential for satisfying the basic energy demand.

As seen above, the development of an electricity distribution network is still high priority in the national development plan or measures in the electricity sector, even at the time of the ex-post evaluation.

2.2 Efficiency (rating: b)

The outputs of this project have generally been achieved as planned. Although the project cost was significantly lower than planned, the project period was much longer than planned, therefore, the evaluation for efficiency is moderate.

2.2.1 Project Outputs

The major outputs of this project are: (1) construction of 33kV express lines, (2)

construction of 33kV gantries (distribution line switchyards), and (3) a consulting service.

As for the express lines, four lines were added to the original plan while one line was removed. The original plan was based on the Medium Voltage Distribution Development for 1995-2000. However, because the implementation period of this project was from 2001 to 2004, the original plan was modified by reflecting the development of the distribution network that had already been started or by changing the priority of activities. Almost all the differences between the planned and the actual other scopes of the distribution lines are the result of a difference in the length measured on the map at the time of appraisal and the actual length according to the field survey.

The difference in the scope at the time of appraisal and actual figures for gantries is very small, with a limited number of cases of the two-section single bus being replaced with three-section single bus for technical reasons.

As for the consulting service, tasks such as the bidding assistance, implementation management, liaison and coordination between the CEB and JICA, assistance in developing a maintenance manual, and preparation of a progress report on a regular basis were all implemented as originally planned. However, according to the extended construction period, the man-months for consulting increased to 36.6 MM from the 25 MM of the original plan.

Because the scale of the change in scope is limited in general, there was no adverse effect in terms of cost.

The appraisal documents included description such as “the executing agency took the stance that consulting is unnecessary for the electricity distribution business at first.” This was confirmed to the CEB, and the CEB explained that they had recognized that the employment of a consultant was necessary for this project. Therefore, it can be judged that the advice of JICA was appropriate. However, because the CEB is gaining experience, it may be able to implement similar projects by itself in the future in similar cases.

2.2.2 Project Period

While the originally planned period was from September 1998 to May 2001[1] (33 months), the actual period was from September 1998 to June 2004 (70 months). This represented 212% of the original plan. If we look at each process, the selection/employment of consultants and contractors took time, which accounted for

[1] The timing of completion is defined as “when the consulting service finishes.”

most of the total delay. However, this was partly inevitable, because the selection process had to be carried out with discretion in order to select suitable companies. The foundation work for the distribution lines also took some extra time as a result of protest by landowners[2]. The poor condition of the planned site, resulting in increased man-hours for piling, also affected the progress of the foundation work.

2.2.3 Project Cost

While the originally planned project cost was 7,679 million yen (with an ODA loan of 5,973 million yen), the actual cost was 4,300 million yen (with an ODA loan of 3,411 million yen). Therefore, the actual cost was 56% of the planned cost, which is significantly lower than forecast. The table below shows a comparison of planned and actual costs, which reveals the large impact of the cost reduction realized through competitive bidding and the adoption of an alternative construction method in the procurement of materials for towers[3]. On the other hand, as for the gantry materials, it is possible that the change in project scope was the reason for the slight cost increase. Similarly, the cost for the construction of towers was also lower than planned, as a result of cost reductions through the adoption of an alternative construction method.

Table 1 Comparison of Planned and Actual Project Cost

Major items	Planned cost *1 (Based on appraisal documents)			Actual cost *1		
	Foreign currency	Local currency	Total *2	Foreign currency	Local currency	Total *3
1. Construction	3,736	471	4,706	2,606	483	3,180
1) Materials for towers	3,029	0	3,029	1,404	0	1,404
2)Materials for gantries	357	0	357	392	0	392
3) Tower construction	346	462	1,298	537	437	1,056
4) Gantry construction	4	9	22	57	46	112
5)Other (consumables)	-	-	-	216	0	216
2.Price escalation	229	92	419	-	-	-

[2] In four of the 27 gantry candidate sites, because the purchase price of the land was lower than the original market price, there was protest from landowners. However, in the end, the expropriation was conducted according to the law. In August 2008, the Ministry of Land and Land Development guidelines approved market-price based compensation, so this kind of problem no longer occurs. According to the JICA office, the number of problems regarding land purchasing is declining because letters of consent for land transfer are being obtained ahead of time once projects start.

[3] While all the materials are purchased in dollars, the dollar/yen rate had been relatively stable so there was no impact of fluctuations in the exchange rate.

3. Land purchasing	0	130	268	0	346	384
4. Contingency	397	56	512	-	-	-
5. Customs	0	698	1,438	0	452	502
6. Consulting services	99	15	130	106	7	115
7. Interest during construction	206	0	206	119	0	119
Total	4,667	1,462	7,679	2,831	1,288	4,300

Source: CEB (interest during construction is based on receipt documents from JICA)
*1. The unit for foreign currency is million yen, the unit for local currency is million rupee, and the unit for the total is million yen.
*2. The exchange rate at the time of appraisal was 1 rupee = 2.06 yen (as of October 1997).
*3. The exchange rate was 1 rupee = 1.14 yen (based on PCR).

2.3 Effectiveness (rating: a)

This project has largely produced the planned effects, and its effectiveness is high.

2.3.1 Operation/effectiveness indicators

The table below shows the status of accomplishing the target figures set forth in advance (at the time of appraisal).

Table 2 Accomplishment of Target Figures for Voltage Level

(Unit: %)

District	Target indicators as of 2001*	Actual figures in 2007
West South & West North	97.4	Ranala: 97.1 Kesbewa: 99.0 Kitulgoda: 99.0
Central	95.0	Galewela: 94.7
North Central	97.0	Thambuttegama: 96.1 Jayanthipura: 93.7
North Western	96.0	Wariyapola: 96.6 Kuliyapitiya: 96.2
Southern	94.5	Tangalle: 97.0 Kamburupitiya: 98.0
Uva	94.8	Passara: 95.2
Sabaragamuwa	-	Madampe: 98.4

* The figures are set at the time of appraisal, and are the maximum figures achieved throughout the year. 100% means 33kV.

Table 3 Accomplishment of Target Figures for System Loss Rate (Medium-Voltage Distribution System)[4]

(Unit: %)

District	Target indicators as of 2001*	Actual figures in 2007
West South & West North	-	-

[4] This is a system loss rate of 33kV in the distribution network in each district.

Central	1.2	1.16
North Central	1.5	1.82
North Western	2.2	1.69
Southern	1.5	0.82
Uva	1.8	3.50[5]
Sabaragamuwa	-	2.20

* Set at the time of appraisal

The voltage level indicators in Table 2 above show that the voltage levels at major points at peak times have improved and are within the scope of 95%-105%, which is the internal target of the CEB. Also, although the system loss rates shown in Table 3 are estimated values based on a system planning model, they show that voltage levels are improving.

The project effectiveness was confirmed as below using JICA's standard operation/effectiveness indicators. Because this project was implemented almost across the entire country except for a limited number of provinces, nationwide measurements were used. Therefore, the degree of improvement seen in the indicators below cannot necessary be attributed to this project alone.

Table 4 Standard Operation/Effectiveness Indicators of Distribution Business

Name of indicator	2003 (year when the facility construction completed)	2004	2005	2006	2007
Maximum electric power (kW)	1,516	1,563	1,748	1,893	1,842
Household electrification rate (%)	67.9	73.4	76.7	78.1	80.1
Amount of electricity sold (Gwh)	6,208	6,667	7,255	7832	8,276
Distribution loss rate (%)*	13.7	13.1	13.3	12.6	11.7

Source: CEB

*Note: Figures for 2003 and 2004 are based on the CEB loss reduction program report (2003-4), and figures for 2005-2007 are estimated from the figures of system loss.

Individual indicators in Table 4 above show that the maximum amount of electric power and the quantities of electricity sold are growing favorably. The major reasons for this are an increase in demand due to economic development and the promotion of electrification in rural areas. The increase in the household electrification rate is also mainly due to the promotion of measures for the electrification of rural areas. Therefore, the contribution of this project to these indicators is limited. However, the decrease in

[5] According to those concerned at CEB, Uva District is larger than other districts and it was suggested that JICA's investment alone is by no means sufficient to reduce the loss rate. However, as there was no other notable investment, this resulted in only a slight improvement on the past loss rate.

the distribution loss rate resulted from the continued development of the medium-low-voltage distribution network, so the contribution of this project is high.

2.3.2 Results of Financial Internal Rate of Return

In this project, because FIRR was not calculated at the time of appraisal, FIRR was calculated in the following manner[6].

(FIRR)

Benefit	Because it is difficult to calculate the exact benefit from the distribution business, the following is used as an alternative: The benefit was calculated by multiplying the loss reduction achieved through the construction of 33kV express lines (calculated from information in the PCR) by the average retail price of electricity.
Cost	Construction cost (including tax) and maintenance cost of facilities
Major preconditions	- It was assumed that the sales price of electricity will decline slightly in the future (based on expected cost reductions and decline in fuel prices). - Increase in electricity demand for each substation is ignored. - Annual maintenance cost is assumed to be 2% of construction cost. - The operating period of facilities is set as 20 years from 2005.
FIRR	21.0%

2.3.3 Results of Economic Internal Rate of Return

In this project, because EIRR was not calculated at the time of appraisal, EIRR was calculated in the following manner[7].

(EIRR)

Benefit	Various benefits, including the stability of voltage and a decrease in the number of power outages, have been derived from this project. The reduction in distribution loss through the construction of 33kV express lines can only be measured in quantitative terms. In this evaluation, the reduced loss calculated from information in the PCR (project completion report) was multiplied by the long run marginal cost to calculate the benefit.
Cost	Construction cost (excluding tax) and maintenance cost of facilities

[6] FIRR is relatively high. This is partly due to the fact that the project cost remains at 56% of the original plan.
[7] EIRR is relatively high. This is partly due to the fact that the project cost remains at 56% of the original plan.

Major preconditions	- The growth in electricity demand for each substation is ignored. - Annual maintenance cost is assumed to be 2% of construction cost. - The operating period of facilities is set as 20 years from 2005.
EIRR	20.4%

2.4 Impact

2.4.1 Impacts to beneficiaries

(1) Industrial development

While figures such as regional GDP are typical macroeconomic indicators, because this project does not involve laying down distribution lines on land without any, it is suggested that the direct contribution to such macroeconomic indicators is limited.

(2) Improvement of residents' standard of living

The household electrification rate of Sri Lanka reached 80.0% in 2007 and increased 10.3% between 2001 and 2005, which is the project period. It is suggested that power generation, transmission and distribution all contributed to this increase in electrification rate. The growth rate[8] during the same period was 35%, 20% and 17%, respectively. The government of Sri Lanka's power sector policy guidelines (2002) mention the promotion of electrification in rural areas, and the implementation of a large number of local electrification projects with the support of donors can be considered a major contributing factor[9].

Furthermore, the share of this project[10] in all the power distribution projects implemented during the same period was 11.1%. However, because this project did not involve laying down distribution lines on land without any, it is suggested that the direct contribution of this project to raising the household electrification rate was limited.

Below is the number of electric user accounts in the project target areas (at provincial level). There are different categories, such as household, religion, industry, commerce and hotel, with the household proportion overwhelmingly large at about 90%. Because medium-voltage distribution systems are not directly connected to the ultimate beneficiaries, it is difficult to calculate the exact number of beneficiaries.

Table 5 Number of Electric User Accounts by Province in Sri Lanka

[8] Power generation is based on generating capacity, and power transmission and distribution are based on the length of lines.

[9] For example, regarding projects with completion due dates after 2000, there are two by the Asian Development Bank, one by the Swedish International Development Cooperation Agency (SIDA), one by Kuwait and one by China.

[10] The share is calculated based on the lengths of the lines.

Province*	2002	2003	2004	2005	2006	2007
North Western	351,965	375,957	402,954	428,433	471,368	509,269
North Central	148,749	158,429	189,530	205,530	223,920	242,655
Western-North	370,181	388,387	407,791	427,695	447,242	466,254
Central	354,981	374,270	393,937	414,380	496,582	524,635
Western-South2	219,823	233,211	246,317	261,117	275,642	290,592
Uva	217,906	232,622	249,103	262,723	283,725	302,111
Sabaragamuwa	261,047	277,354	295,400	314,415	284,147	306,927
Western-South1	156,560	164,634	174,196	183,137	192,281	201,544
Southern	377,277	398,736	421,094	443,692	474,633	510,864
Total of the target areas of the project	2,458,489	2,603,600	2,780,322	2,941,122	3,149,540	3,354,851
Nationwide	2,827,713	3,006,720	3,206,892	3,396,047	3,636,242	3,866,987

Source: Ceylon Electricity Board, Sales and Generation Data Book
*Note: Seven provinces throughout Sri Lanka (comprising nine provinces + Colombo) were selected as target areas for the electricity distribution project. Among the seven provinces, the Western province is divided into three, and all are within the target area of the electricity distribution project.

Furthermore, specific examples of impacts are as follows.

Example 1: An on-site investigation and interviews were carried out at a sewing factory near the switchyard for distribution (gantry) at Thulhiriya, and the following was found.

Before 2005, the voltage level was low, which had been affecting the operation of the large machinery (such as the yarn waste suction machine). This has not been happening recently. Before (the implementation of this project), power outages were occurring at a rate of about 30-40 hours in total every month. Now (or at the time of the on-site investigation), monthly power outages are less than 10 hours.

If we think about the reduction in power outages mentioned above, the following are considered to be relevant factors: although there was already a distribution line from the Thulhiriya switchyard to an area near the plant, it was replaced with a wider one through this project. The height of the line was also raised from 7.1m to 14m. It is considered that these measures helped to stabilize the voltage and reduce contact with trees, resulting in the reduction of power outages.

Example 2: A supplementary investigation was carried out by the local consultant after the first on-site investigation. According to the investigation, the following effect of the project was confirmed in a city called Kurunegala, which is located

about 100km north of Colombo.

Before the project, Wariyapola Gantry and Kurunegala Switchboard were connected by an old distribution line (1 line), and the power supply to the neighboring area was unstable. However, with the new gantry constructed in Wariyapola, connecting it with Kurunegala Switchboard by a new distribution line (2 lines), the power supply improved. The specific effects are as follows:

(1) The facilities mentioned above were completed in late 2007. The number of local power outages decreased dramatically from 634 in 2007 to 177 in 2008.
(2) According to the interviews conducted at the two sewing factories near the above facilities, because of the frequent power outages, as well as the problem of voltage reduction, they used to use generators. However, the situation has apparently now improved, the problem of voltage reduction been resolved, and the number of power outages is declining.

2.4.2 Impacts on the environment

The environmental checklist used at the time of appraisal and preparation of PCR was used to confirm the current status through interviews with CEB staff. It was confirmed that there were no particular adverse effects on humans or the natural or residential environment. We also spoke to some of the local residents at the time of the on-site investigation, and no adverse effects from the transmission facility were found. It is considered that there are no particular problems in terms of the surrounding environment.

2.4.3 Resident relocation and land acquisition

The construction of express lines and 27 gantries is progressing as planned. However, in some cases land acquisition did not go smoothly: while the necessary land had been purchased, in four of the 27 gantry candidate sites, the purchase price of the land was lower than the original market price. This caused protest from landowners. However, in the end, the expropriation was conducted according to the law and there are currently no unsolved problems.

In August 2008, the Ministry of Land and Land Development guidelines approved market-price based compensation, so this kind of problem no longer occurs.

2.5 Sustainability (rating: b)

Although there are no problems regarding the operation and maintenance capacity or the system of the executing agency, the executing agency is recording continuous losses

and there is a problem in terms of financial sustainability. Therefore, the sustainability of this project is fair.

2.5.1 Executing agency

2.5.1.1 Structural aspects of Operation and Maintenance

CEB currently consists of nine departments, namely Generation Department, Transmission Department, four Distribution Departments for different regions, two departments in charge of the operation and maintenance of projects in operation, and Financial Affairs Department. The total number of staff is 14,614[11], as of the end of 2008. One or two chief engineers in charge of the important operation and maintenance for transmission lines and substations are assigned to each of the four Distribution Departments. Under the chief engineer, several electric engineers are also assigned. In addition, there are about 50 area electrical engineers in charge of the simple operation and maintenance assigned throughout the organization.

The total number of staff across all Distribution Departments is 10,723, including 239 engineers.

2.5.1.2 Technical aspects of Operation and Maintenance

According to the CEB Headquarters and engineers working on-site, technical capabilities are sufficient to operate the facilities.

The qualifications and experience required for engineers are as follows: 30 years of experience (on average) and an engineering qualification accredited by the Engineer Association for the assistant general manager (AGM) of each region; 20 years of experience (on average) and an engineering qualification for the deputy general manager; and about 10 years of experience and an engineering qualification for chief engineer and similar positions. As for lower positions, an engineering qualification is required (not necessarily long years of experience) for electric engineer, while more experience than for electric engineer but less than for chief engineer is required for the area electrical engineer.

Training based on the original curriculum is given to engineering staff at the CEB training center. According to interviews with several executive officers in the Distribution Department, there is a slight shortage of engineers, which is slightly affecting operation and maintenance.

2.5.1.3 Financial status of operation and maintenance

[11] The number of staff as of the end of 2008.

The actual operation and maintenance cost regarding distribution facilities over time are shown in table 6 below. Cost has been increasing recently and is now at a level suitable for routine operation and maintenance.

Table 6 Change of Operation and Maintenance Cost

Unit: million rupees

2003	2004	2005	2006	2007
7,169	5,822	5,294	6,507	8,541

Table 7 Statement of Balance of Payments of CEB

Unit: million rupees

Fiscal year	2009 (expected)	2008 (provisional)	2007	2006	2005	2004	2003
Gross sales	115,492	115,653	87,574	69,941	55,978	51,119	47,719
Direct cost	116,199	155,236	112,754	81,733	71,027	61,564	48,363
Gross operating profit	-707	-39,583	-23,477	-11,792	-15,049	-10,445	-644
Operation and maintenance cost	4,063	1,415	1,379	2,383	2,518	634	2,347
Operating profit and loss	-4,770	-40,998	-24,856	-14,175	-17,567	-11,079	-2,991
Other income*1	4,248	3,562	11,748	9,572	16,348	2,017	5,440
Interest payment	1,560	1,600	1,703	1,521	5,634	6,645	6,199
Profit and loss before tax	-2,082	-39,036	-14,811	-6,125	-6,852	-15,707	-3,750

Source: Annual Report (2006)

Note *1. “Other income” includes government subsidies of 11.3 billion rupees for FY2005, 5 billion rupees for FY2006 and 5 billion rupees for FY2007.

Table 7 shows the CEB statement of balance of payments. Direct cost (cost for power generation, transmission and distribution) constantly exceed gross sales, and CEB posted a current loss[12]. In order to support CEB, the government of Sri Lanka offered subsidies of 5 billion rupees or more between FY 2005 and FY 2007[13]. In 2008, loss before tax temporarily increased to about 39 billion rupees; however, it is expected that it will fall to 2.1 billion rupees in 2009. As a background to this, while there is a sales increase due to a growth in electricity consumption and sales price increases, power generation cost is decreasing as a result of the decline in crude oil prices.

In addition, a coal thermal power plant that is receiving support from the Chinese government is scheduled to start operations in 2011. It is expected that this plant will

[12] The price of electricity for users of CEB is set at a level whereby revenue and expenses are balanced each fiscal year (it is not decided by building up costs). The price is rising, and the average prices for 2005, 2006 and 2007 were 7.71, 8.99 and 10.56 respectively (unit: Rs/kWh). The collection rate is more than 99.5%.

[13] According to the general manager and the financial director of CEB, in addition to these subsidies, the government is offering a grace period for the payment of principal and interest for various project debts accounting for 62 billion rupees in total until the expected start of the operation of thermal power plant in 2011. In addition, half of such debts are scheduled to be swapped for equity without repayment obligation.

generate about 20% of the entire power generation in Sri Lanka and therefore a further decline in power generation cost is anticipated with an increase in relatively cheap thermal power generation.

Generalizing from these facts, the financial situation of the entire CEB is clearly improving. However, it is almost certain that it will continue to be run at a loss until 2009, and also because there is a temporal external factor, namely the rapid drop in crude oil prices, behind the financial improvement, it will be necessary for CEB in the future to implement an effective cost management system and to establish financial soundness by gaining a clear understanding of the factors contributing to profit and loss for operating divisions.

2.5.2 Current status of Operation and maintenance

The facilities are operating favorably in general[14].

The actual status of the operation and maintenance of facilities is as follows.

- A routine checkup is implemented once every quarter by the regional electric engineer. Specifically, obstacles are removed from distribution lines, abnormalities of distribution lines are identified visually, an external check is carried out on the transformer and the circuit breaker is checked (to verify that there are no oil leaks or other problems).
- Inspections are implemented once a year by engineers of each division. Specifically, the oil in the transformer is changed (if found to be necessary after testing), the equipment installed for distribution lines and gantries are checked, defective isolators are replaced and isolators are cleaned up.

Such operation and maintenance services are implemented in accordance with the manual provided by the equipment manufacturer and a manual prepared by CEB based on its own experience, and this is judged to be adequate. Components are procured as needed. There are also enough inventories and no particular problems have been found.

Although this is not limited to this project, in the case of medium-voltage distribution systems, there is a general risk of trees obstructing the distribution lines.

3. Conclusion, Lessons Learned and Recommendations

3.1 Conclusion

Summarizing the evaluation results above, the relevance and the effectiveness are high

[14] According to inspections carried out by the evaluator and the local consultant, no particular problems were found in the facilities constructed under this project. By asking the four Distribution Departments of CEB, it was confirmed that there are no problems at all for region 1, and while there are some minor issues for the other three regions, there are no serious problems in terms of facility operation.

(rating: a). However, the efficiency and the sustainability are moderate (rating: b). In light of the above, this project is evaluated to be satisfactory.

3.2 Lessons Learned

N/A

3.3 Recommendations

For CEB, the executing agency

- It is considered important to introduce an electricity pricing system reflecting cost, following the passage of the new Sri Lanka Electricity Law at the Parliament.
- An efficient management system should be implemented by clarifying the cost structure of the Distribution Departments under SBU.
- Because some of the full-time posts are still vacant, staff at the worksite are feeling overburdened. It would be desirable to improve the financial status of the entire organization to increase the operation and maintenance budget and to increase the number of staff.
- In the case of medium-voltage distribution systems, there is a general risk of trees obstructing distribution lines. Therefore, it is necessary to regularly inspect and prune the trees.

Comparison of the Original and Actual Scope

Item	Original	Actual
(1) Project Outputs		
1. Construction of 33kV express lines	303km (2 lines)	315.26km (2 lines, generally as planned)
2. Construction of 33kV gantries (distribution line switchyards)	27 locations	27 locations (generally as planned)
3. Consulting service	25MM	36.6MM
(2) Project Period	September 1998 – May 2001 (33 months)	September 1998 – June 2004 (70 months)
(3) Project Cost		
Foreign currency	4,667 million yen	2,831 million yen
Local currency	3,012 million yen (local currency: 1,462 million rupees)	1,469 million yen (local currency: 1,288 million rupees)
Total	7,679 million yen	4,300 million yen
Japanese ODA loan portion	5,973 million yen	3,411 million yen
Exchange rate	1 rupee = 2.06 yen (As of October 1997)	1 rupee = 1.14 yen (Based on PCR)