Chapter 14 Implementation Strategies for PV Rural Electrification

Chapter 14 Implementation Strategies for PV Rural Electrification

14.1 Institutional and Policy Support Measures for Promotion of the Ongoing PV Rural Electrification Project

(1) The Current Policy Framework and Incentives in Botswana

The government of Botswana has prescribed its strategy and policy for the energy sector in its National Development Plan 8 that aims at providing a least cost mix of supply through maximum private sector participation with enabling mechanisms such as financing arrangements, capital subsidies, tax structures, regulation of monopolies. The NDP limits the government role to regulatory interventions which provide incentives for more efficient performance, specifically in electric power to address the need to accelerate household electrification and the need to continually review cost of electricity to make it more affordable.

The NDP recognizes the actual low electrification rate - only 3 % of the rural households and 24 % of the urban households use electricity – and intends to raise it–not explicitly showing the target rate- through extension of the electricity grid into rural areas and through alternative supply sources including photovoltaic systems to make electricity more affordable and accessible. As for the extension of the grid, the following parameters are set to be satisfied: 50km distance from an existing distribution network, population size more than 2,000, anticipated take up of business and government points of supply at 50 % of potential in the first year, load growth 5 % given project of 20 years and expected discount rate of 6 % using discount cash flow for viability determination.

The NDP intends to continue the Rural Electrification Collective Scheme (RCS), a financing mechanism to reduce up-front payments for connection in order to promote on-grid electrification and also intends to promote increased use of PV electrification in an orderly way with adequate coordination, institutional support, financing and technical standards. As for PV electrification in particular, Manyana Pilot Project will be replicated nationwide as NPVREP (National PV Rural Electrification Project) using a financing mechanism to make PV systems more affordable to communities.

PV electrification is thus included in national electrification planning to address the national needs optimally.

In the RCS, the customer deposit contribution was reduced from 40% to 10% of the connection fee and the government bridge the finance portion, which is repaid over 10 years by the customer with 10 % of interest rate. The still high connection fee, even when spread over 10 years with government help, has kept the percentage of households receiving electricity supply at low levels (15% urban and 3% rural). Low village population densities, and their spread over a wide area, make it difficult for the rural communities to group themselves to take advantage of the RCS. The government has once again relieved the conditions such as the initial payment at 5% of the connection fee and the repayment period for 15 years with 14 % of interest rate.

The NPVREP, which adopts Manyana Pilot Project as dissemination model based on consumer financing, has seen a low uptake –234 installations for 2 years from the starting year up to mid-1999 against the target 237 per year because of a large initial payment among other reasons. The conditions for the consumer financing are such that the down payment is 15 % of a PV system cost and the repayment period is 4 years with 14 % of interest rate.

Whether grid electrification under the RCS or NPVREP under consumer financing, the actual mechanism for promotion of electrification is based on the loan, expected to provide incentive for consumers to remove the largest barrier of high upfront cost.

Under the current institutional framework, RCS is implemented by Botswana Power Corporation as part of its expansion plan but financially subsidized by the government and NPVREP by RIIC (Rural Industries Innovation Center) under a cost-plus- fixed-fee contract with the government.

(2) Government Subsidy and Incentive Program for Grid Expansion and Grid Connection

BPC collects the connection fee as a lump sum payment from customers who want to receive electricity. The electric tariff does not include the cost of connection to the grid. Therefore, RCS is provided in order to pay the

connection fee. RCS started in 1988 and consumers had to pay all construction cost required for grid in the form of 40 percent down payment and the remaining amount is paid as monthly installment with the interest rate of eight percent for ten years. In 1995, the down payment reduced from 40 percent to 10 percent and the balance is paid as monthly installment with the interest rate of nine percents. This interest rate was much lower than the prime rate of 14 percent at that time and the government subsidized the balance of interests. In 1997, BPC set up the standard connection fee which is same within 500 m from the grid in order to reduce payment requirements. In April 2000, RCS is revised to make them more affordable. The up-front payments have been reduced and the repayment periods increased. The payment terms for new electricity connections have been revised as follows:

Prospective customers requiring less than 35 kW of electrical power shall pay an up-front payment of five percent (minimum) of the connection fees comprising capital works and/or service costs.

1) the balance of 95 percent (maximum) shall be paid over a period of 15 years at prime interest rate;
2) the balance of 95 percent shall be paid over a period of five years at prime rate less 0.5 percent;
3) the balance of 95 percent shall be paid over a period of 18 months at no interest if the balance is less than P50,000;
4) the balance of 95 percent shall be paid over a period of 18 months at prime rate less one percent for a balance above P50,000.

Prospective customers requiring electrical power of 35 kW and above shall pay an up-front payment of ten percent (minimum) of the connection fees.

1) the balance of 90 percent (maximum) shall be paid over a period of ten years at prime interest rate;
2) the balance of 90 percent shall be paid over a period of five years at prime rate less 0.25 percent;
3) the balance of 90 percent shall be paid over a period of 12 months at no interest if the balance is less than P50,000;
4) the balance of 90 percent shall be paid over a 12 months at prime rate less one percent for a balance above P50,000.

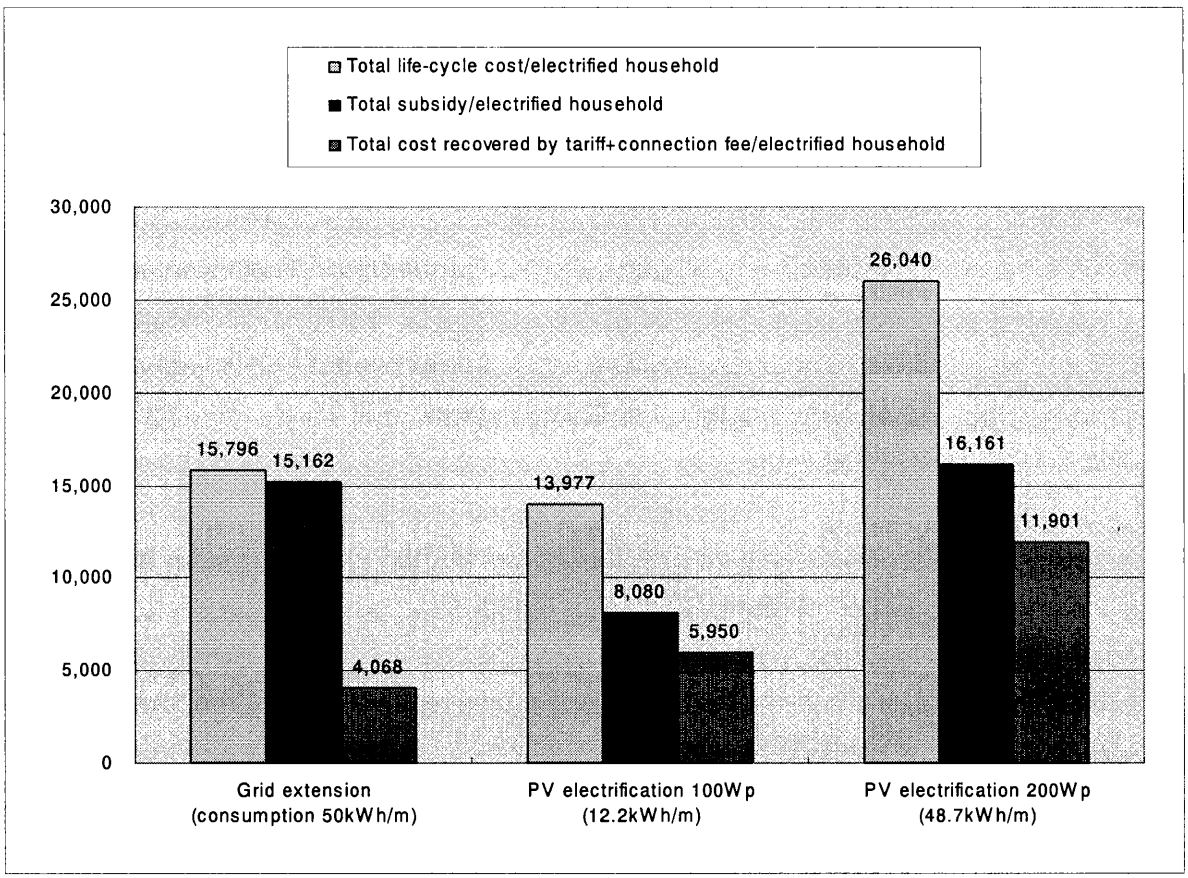
Consumers are able to select one of the above options.

Summary evaluation of RCS done in 1999 by EAD/EECG is shown in Appendix Table 14.1-1.

Regarding grid extension, the government provides half of the total construction cost if the IRR of the project is less than 6% and the government approves the project. However, the government is subsidizing 100% of the investment cost for the on-going grid extension project for 72 villages. The subsidy for the 72 villages grid-extension project and proposed subsidy for PV rural electrification business plan discussed in Chapter 13, are compared in Figure 14.1-1 on a benefited household basis.

In Chapter 7, the comparison was made, supposing that the 72 villages were PV-electrified taking the case of BPC's 72 village electrification as a basis of comparison. In the comparison, total life-cycle costs were calculated both for grid extension and PV electrification.
On the same calculation basis, comparison of subsidy per household benefited by electricity supply (60% of total households in 72 village) was made. The results are shown in Figure 14.1-1.
Figure 14.1-1 shows that the subsidy allocated for grid-electrified household is almost two times more than the subsidy for the household of average 100Wp consumption level.
If the village has 200Wp average consumption level, the subsidy per household will be a little more than the one for grid.

As mentioned in Chapter 7, the average consumption level in rural area is assumed less than 200Wp and therefore, subsidy allocation proposed in Chapter 13 "PV Rural Electrification Project Plan" will be reasonable. Apart from the allocated subsidy per household, cost recovery ratio in case of proposed PV electrification scheme is much better than the one for grid electrification as mentioned in Section 7.2.3.



Note: Grid extension (Subsidy: 100% of initial investment cost excl. connection cost)
PV electrification (Subsidy: 80% of investment cost including battery exchange cost for 12 years operation)

Figure 14.1-1 Comparison of Subsidy per Household

(Life-cycle Cost for 20 Years at Discount Rate 15%)

(3) Supportive Policy for Photovoltaic Electrification in the World

1) Concession system adopted in South Africa and other countries (see Appendix Document 2.3-1)

In Northern Province of South Africa, a PV electrification project is operated under the concession system (covering 50,000 households). The PV system costs 3,200 Rand per household, against which the government provides subsidy of 2,800 Rand (87.5% of the average cost).

In the case of the PV electrification project carried out jointly by ESKOM/Shell and ESKOM/BP, ESKOM provides similar subsidy.

In Argentine and Mexico, the concession approach is used for PV-based rural electrification projects.

2) ESCO system in Banpres Project, Indonesia (see Appendix Document 2.3-1)

Banpres Project serves approximately 20,000 households, each of which pays US$25 for initial cost and US$3 per month. The government provides subsidy covering more than 50% of the customer payment. Based on experience in the project, the Indonesian government is now installation 200,000SHS under the World Bank's loan, GEF.
Similar projects are underway in the Philippines, Nepal and Pacific islands.

14.2 Recommendations on Policy Framework and Incentives

(1) Evaluation of Current Policy Framework and Incentives

Review of the current policy framework and incentives, as described in the previous section, shows that the policy goal toward the increased rate of electrification has not been attained at a satisfactory level so far. Even if a village is electrified by extending a distribution line thereto, most households cannot afford connection to the distribution line because of the high connection fee even under the RCS. The same can be said of NPVREP.

Botswana is one of the richest countries in the region in terms of GDP per capita but its income distribution is considerably uneven. Most households, especially in rural areas, cannot afford to pay the upfront cost for electrification whether under the RCS or NPVREP so that the percentage of households receiving electricity has not increased significantly. Besides the low income of rural households, collateral and creditworthiness for the loan is another factor contributing to the low uptake of electrification.

As far as the policy goal consists primarily in increased rate of electrification, policy incentives should be centered on reduction of the PV system cost in its life cycle whereby the barriers to access to PV electrification can be removed – the large upfront cost and monthly payment; hence, it is recommended that NPVREP should change from the loan approach to the ESCO approach, which can remove the barrier to access to PV system by spreading the heavy capital cost over the service life of PV system.

(2) The 10% VAT will be imposed on all goods and services in July 2001 and will likely discourage potential customers from using the PV system if it is added to the service charge, resulting in a significant decline in the electrification rate. Thus, the project should be exempted from the VAT.

14.3 Objectives and Strategies for PV Rural Electrification Master Plan

In order to accomplish the goals, the following four objectives are set forth, and strategies for accomplishing these objectives are summarized as follows.

14.3.1 Objective-1:

To supply solar electricity, quickly and under affordable conditions, to households in rural areas that cannot benefit from grid electrification and other energy supply services

(1) Strategy required for the central government

1) Basic policy for regional development: Improvement of social equity, development of a general framework for regional economic development, and related legislation
2) Establishment of an organization to promote rural electrification as part of the national development program (NECC)
3) Establishment of an organization to coordinate, manage and control the PV Rural Electrification Project (Management Committee of PV Rural Electrification).
4) Designation of the implementation body for PV rural electrification
5) Determination of division of responsibilities for promotion of PV electrification among related organizations
6) Establishment of the target electrification rate
7) Development of a general framework for financial support for PV rural electrification projects
8) Coordination, monitoring and follow-up activities related to promotion of PV rural electrification

(2) Strategy required for the demand sector

1) Socioeconomic study on villages and localities (including public facilities): Survey and assessment of local needs (requirements by potential users) and demand (portions of needs for which potential users are willing to pay as the user charge)
2) Development of a comprehensive energy utilization plan including electricity on the basis of the basic plan (taking into account population and demand outlooks)
3) Development of measures to maximize the effect of PV utilization

(3) Strategy required for the supply sector

1) Development of a medium- and long-term grid expansion plan and a PV electrification plan on the basis of the results of analysis of local needs and demand
2) Development of a transitional PV electrification plan for areas where grid electrification will likely be delayed

14.3.2 Objective-2:

To implement the PV rural electrification project at the least practicable cost and in a financially feasible and sustainable manner

(1) Strategy required for the central government

1) Selection criteria for electrification projects according to priority
2) Integration with the existing PV rural electrification program (NPV-REP)
3) Allocation of government subsidy required for sustainable operation of PV projects
4) Exemption of the VAT for PV service charges
5) Exemption of import duties of equipment and materials for the project
6) Development and upgrading of PV-related technology standards
7) Promotion of related industries

(2) Strategy required for the demand sector

1) Public education and advertisement on the effective use of the PV electrification system
2) Institutional setup to promote electrical appliances

3) Promotion of active participation in the PV electrification project

(3) Strategy required for the supply sector

1) Establishment of selection criteria for grid and off-grid electrification projects (including PV): Optimization of an electrification system based on least cost analysis
2) Setting of user charge required to achieve the target electrification rate, and development of a business plan to enable sustainable management
3) Criteria to select PV electrification project areas according to priority
4) Criteria to select priority areas for rural electrification
5) Planning and implementation of programs to ensure self-sufficiency and sustainability of the project
   i) Rationalization of the central implementation body and its operation (effect use of existing infrastructure, optimum manpower allocation, etc.)
   ii) Empowerment to local organizations (first line maintenance, collection of service charge, etc.)
   iii) Use of private initiatives
6) Education on PV technology to local residents
7) Training of service engineers within the implementation body
8) Education and training of first line maintenance personnel in villages

14.3.3 Objective-3:

Integration with infrastructure projects required for a specific region or area

(1) Strategy required for the central government

1) Development and implementation of an integration plan with other infrastructure projects that need to be implemented in parallel to the electrification project
2) Establishment of the recycling system for waste batteries

(2) Strategy required for the demand sector

1) Promotion of efficient use of energy including electricity

(3) Strategy required for the supply sector

1) Supply of required energy other than electricity
2) Improvement of project viability using additional benefits from integrated implementation (development of additional demand and the improvement of the payment ability)

14.3.4 Objective-4: Expansion of environmentally friendly energy use

(1) Strategy required for the central government

1) Development of public support policy for prevention of global warming, and evaluation of externality
2) Promotion and coordination for use of reusable energy
3) Development and promotion of technology and equipment using the reusable energy, including the PV system
4) Legislation and legal control to promote the establishment of the recycling system for safe disposal of lead/acid batteries

(2) Strategy required for the demand sector

1) Public advertisement on efficient use of energy including electricity

(3) Strategy required for the supply sector

1) Development of future PV strategy for various applications for prevention of global warming
2) Development and promotion of technology and equipment using the reusable energy, including the PV system
3) Legislation and legal control to promote the establishment of the recycling system for safe disposal of lead/acid batteries

Appendix

Appendix 1 Summary of the Activities for the Master Plan Study

Appendix 1 Summary of the Activities for the Master Plan Study

1.1 Establishment of Study

1.1.1 Counterpart and Steering Committee Member

(1) Counterpart

Energy Affairs Division (EAD), Ministry of Minerals, Energy and Water Resources (MMEWR)

(2) Steering Committee Member

Ministry of Minerals, Energy and Water Resources (MMEWR)
Ministry of Finance and Development Planning (MFDP)
Ministry of Local Government (MLG)
Ministry of Education (MOE)
Department of Electrical and Mechanical Services (DEMS)
Botswana Power Corporation (BPC)
Rural Industries Innovation Center (RIIC)
Botswana Technology Center (BoTeC)

1.1.2 Organization and Assignment of Study Team

1) Isao SHIZUMA ····· Team Leader
2) Junji MATSUMOTO ····· Rural Electrification (1st)
3) Dr. Johannes OPPERMAN ··· Rural Electrification (2nd and 3rd)
4) Toshiyuki KUWAHARA ···· Economic & Financial Policy and Management
5) Makoto NAKAMURA ····· PV Dissemination Scheme
6) Takanori OMORI ····· PV System
7) Tetsuro TANAKA ····· Financial Policy & Institutions
8) Mineo HIROSE ····· Socio-economic Survey
9) Masashi AKAMATSU ····· PV Equipment
10) Taiichi KONDO ····· Coordinator
11) Hideki KIDANI ····· Coordinator

1.2 Progress of the Study in the Fiscal Year 2000

The progress of the study during the period from August 2000 to March 2001 was as follows:

1.2.1 First Field Survey

The first field survey was carried out between early September and the end of October 2000. For the first field survey, the following activities were planned and conducted:

1) Collection and Review of Information
2) First Workshop
3) Socio-economic Survey of Villages
4) Investigation of the Approaches for Promoting Photovoltaic Electrification
5) Study of the Optimal Rural Electrification Plan
6) Study of the System Design and Policy Recommendations
7) Evaluation and Study of Measures for Improvement of Photovoltaic Technology
8) Study of Human Resources Development Plans
9) Study of Rural Electrification Planning
10) Study of Financing
11) Study for the Dissemination Project

1.2.2 Second Field Study

The second field survey was carried out between January 19 and February 19, 2001. The following activities were conducted.

(1) Socio-economic Survey of Villages

In continuation of the socio-economic survey of villages, study results were compiled. During the second field study meetings were held in the candidate target villages to explain the plans, the nature of the contracts, and to call for applicants to participate. For each household or facility that expressed interest in participating, information was collected on ability to pay, demand for electricity, and other matters needed to ensure optimum design of the system.

(2) Second Workshop

The second workshop and steering committee was held and there were discussions with Botswana officials regarding the draft proposals and plans prepared during the first phase home-office work period. The key issues were final selection of three villages for the Dissemination Project, and decision on the project implementation body. The details are described in Section 1.1.3

(3) Final Determination of Dissemination Project Plans, and Preparation for Procurement and Installation of Photovoltaic Systems

Due to the delay in final selection of three villages for the Dissemination Project and the Implementation Body for the Project, plans and preparations for procurement and installation of PV systems could not be completed.

1.2.3 Key Activities in Basic Study

(1) Selection of Three Villages for Dissemination Project

Based on the result of the EECG survey, the Study Team performed analysis and presented the result to the steering committee.

Based on the result of the Steering Committee Meeting, the Study Team and sub-committee members nominated by the Steering Committee under a set of selection criteria recommended the following villages to the steering committee for final approval.

i) Central district (Bobonong sub-district): Motlhabeneng (approx. 178 households as of 2001)
ii) Central district (Mahalapye sub-district): Kudamatse (approx. 230 households as of 2001)
iii) Southern district: Lorolwana (approx. 136 households as of 2001)

But, final decision could not been obtained during the 2nd Field survey. For this reason preparatory works such as solicitation of applicants and PV system design for each applicant could not be commenced and preparatory works for tender to select a contractor for PV system purchasing and installation.

Meanwhile, the Study Team presented the project plan to key departments and personnel of district councils where the three villages were located and

village authorities. After their approval, the Study Team held local meetings in the three villages to explain the project and solicit participants, together with collection of information.

(2) Selection of the Project Implementation Body

Based on the results of the first field survey, the Study Team proposed the Ministry of Local Government and District Councils as the most suitable implementation bodies for the Master Plan and the Dissemination Project that is designed to promote PV systems on a community basis. The Study Team presented the recommendation to the steering committee, where various alternatives were also proposed. It was decided that the Study Team would conduct additional study based on the revised selection criteria.

Accordingly, the Study Team reevaluated the candidate organizations and selected RIIC as the primary candidate, which was then proposed to EAD. However the implementation body for the Master Plan and the Dissemination Project could not be finalized before the third field survey.

1.2.4 Third Field Survey

The third field survey was carried out between June 9 and October 18, 2001. The following activities were conducted.

(1) Discussion on Progress Report

The third Steering Committee Meeting was held on the Progress Report containing the draft proposals and plans prepared as the outcomes of Basic Study of the First Phase. Decision was made to include the localities that have more than 400,000 populations into the target scope for PV electrification. The 3 villages were officially decided for Dissemination Project as proposed by the Study Team. However, it was decided to reconsider RIIC proposed by the Study Team as the Implementation Body, due to anxiety of implementation capacity to cover the enlarged target scope for PV electrification and the anticipated difficulties for EAD to make controls and delegation of power due to RIIC's report route to a different Ministry.

(2) Nomination of the Implementation Body and Finalization of Details of Dissemination Project

After re-evaluation, BPC was proposed by the Study Team on June 21, 2001 and finally decided as the Implementation Body for the Dissemination Project and the nationwide projects that are to be implemented according to the Master Plan.

As soon as the Implementation Body was selected, it was expected for BPC to start necessary activities for the implementation of the Dissemination Project such as consultations with District Councils and village chiefs, Kgotla presentation, solicitation of applicants and conclusion of end-user agreement, collection of deposit money from contracted end-users, etc. However, delay in conclusion of the agreement for the Project implementation between EAD and BPC restricted BPC's activities.

(3) Solicitation of Applicants, Conclusion of End-user Contract and Collection of Deposit

Despite the restrictions above-mentioned, the team composed of BPC/EAD/Study Team was engaged in materialization of the Dissemination Project, starting visits to Central District Administration on July 10, 2001 and so on. As the results of such endeavor, 116 end-users applied and concluded contract to use totally 175 sets corresponding to 50Wp systems as of August 23, 2001. Tender document was prepared based on the results, considering required spare sets. Deposit money collection was delayed due to the reasons of BPC's internal formalities and lack of money in households. It was expected that inhabitants would be encouraged to make decision if they saw the PV system installation at sites and solicitation and deposit collection were continued even during construction until final closure on January 18, 2002.

(4) Tender Call and Selection of Contractor

Tender documents were prepared, consulting with EAD/BPC and tender was called on September 7, 2001 and closed on October 3, 2001. Under mutually agreed evaluation criteria, tenders were evaluated and Solar International Botswana (SIB) was selected as the contractor and the Contract was concluded by JICA Botswana and SIB and BPC witness-signed it.

1.2.5 The Fourth Field Survey

The fourth field survey was carried out between November 3, 2001 and January 2, 2002. The following activities were conducted:

(1) Kick-off Meeting of the Works and Commencement of the Work

Kick-off meeting was held on November 5, 2001 and the Contractor's works were commenced. However, deposit collection was not successful in three villages, because of inhabitants' lack of money when BPC's personnel in charge visited villages to collect money. Construction started for the fully paid clients and continued money collection allowing partial payment. It was agreed that systems were installed for such partially paid clients on condition that they complete payment by the start-up and otherwise the system will be removed.

(2) Training of Maintenance Personnel

BPC's local officers who are in charge of maintenance were nominated. Training of BPC personnel (2 supervisors each from Lobatse, Selibe Phikwe and Palapye local offices, total 6 supervisors) including two commercial officers was done in BPC's training room by SIB for two days starting from November 23, 2001. On-the-job training for the resident village agents and first line maintenance personnel was planned to be done during the installation of systems. However, due to BPC's delay in nomination and contracting with such agents and personnel the training was done during the free-use period immediately after installation of the systems.

1.2.6 The Fifth Field Survey

The fifth field survey was commenced on January 3, 2002 and finished on March 7, 2001. The following activities were conducted:

(1) Inspection and Acceptance of the Contractor's Works

The installation works in the three villages was scheduled to finish by the end of January 2002. However, it was agreed that as many end-users as possible should be allowed to participate to the Dissemination Project and significant villagers would be encouraged to pay deposit when the installation went on.

Final closure of deposit payers was set on January 18 2002. Actually after the closure date there were additional payers and such households were included in system installation by the Contractor. However, final acceptance date of installation for such latecomers will be allowed to extend. The team composed of JICA Study Team/BPC local officers inspected installation and acceptance was made by the middle of February.

(2) Establishment of Organization Setup and Start-up of the Dissemination Project

BPC's nomination of village agents for token vending and first line maintenance persons were delayed. For this reason vending token in an agent commenced from the end of February 2002 and end-users were given one month free token to test-operate their systems as soon as the systems were accepted by JICA Study Team. Manuals to operate various activities were prepared and those manuals should be improved in the course of operation of the Project.

(3) Discussion on the Key Issues on the Master Plan Formulation

Study Team drafted discussion materials on the key issues on the Master Plan. Discussion was made on the key issues at the fourth Steering Committee Meeting, and with BPC and EAD.

(4) Dissemination Project Site Visit

Dissemination site visit inviting government officers and personnel related to PV dissemination was held in the Fifth Field Survey.

1.2.7 The Sixth Field Survey

The sixth field survey was carried out during 22 June 2002 and 26 July 2002. The following activities were conducted.

(1) Monitoring of Dissemination Project

The Study Team visited Kudumatse, Motlhabaneng and Lorolwana three times at an interval of one to two weeks during the survey period, and monitored the operation. The Study Team discussed the management strategies with EAD, BPC and SIB, based on the results of monitoring.

(2) Discussion on the key concept of Master Plan

The Study Team discussed key issues on Master Plan with EAD/BPC and at Steering Committee Meeting.

1.2.8 The Seventh Field Survey

The seventh field survey was carried out during 19 January 2003 and 8 February 2003. The following activities were conducted.

(1) The Study Team visited Kudumatse, Motlhabaneng and Lorolwana and monitored the operation. The Study Team discussed the results of monitoring with EAD and BPC.

(2) The second seminar was held at Boipuso Hall, inviting Permanent Secretary of MMEWR, members of Steering Committee, representatives of related Ministries, representatives of District Councils, representatives of PV industries, representatives of private sector and NGO. The Study Team presented the key issues of Master Plan. Then, the participants were divided into 3 groups and each group presented their comments and the discussion was made.

(3) The last Steering Committee Meeting was held on 3 February 2003. The results of the Second Seminar was discussed. Procedures for properties transfer of equipment and materials for Dissemination Project and office equipment were discussed and agreed.

1.3 Summary of Activities During Fiscal Year 2000 and 2001

Summary of activities during fiscal year 2000 and 2001 is shown in Appendix Figure 1.4-1.

1.3.1 Activities that have been Accomplished During the Period

(1) Basic study

In order to formulate PV Rural Electrification Master Plan, basic studies including socio-economic survey in selected 10 villages were accomplished and the following plans were drafted in the Progress Report dated March 2001:

* A scheme for PV rural electrification
* Optimum rural electrification program
* A system design and policy for PV dissemination
* Policy for reform of PV related technologies
* Manpower development plan
* A PV electrification business plan
* Financial plan
* Policy for Dissemination Project

(2) Dissemination Project

In order to validate plans drafted, Dissemination Project was planned and has been implemented. The following activities were accomplished for this purpose:

* Selection of three villages where Dissemination Project is implemented (Motlhabaneng, Kudumatse and Lorolwana)
* Selection of the Implementation Body for Dissemination Project: BPC
* Consultation with each local authorities
* Presentation at village kgotla and solicitation of applicants
* Conclusion of end-user agreement with each user and collection deposit money
* System design and preparation of bill of materials
* Preparation of tender documents and tender call
* Bid evaluation and selection of the Contractor: Solar International Botswana (SIB)
* Kick off the works and supervision and inspection of the works
* Acceptance of the works.
* Training of BPC local officers (by SIB and on-the-job training by Study Team)
* Manuals for end-user and maintenance personnel

* Manuals and procedures for operation of the project
* Review plans drafted in Basic Study and revision per lessons learned afterward

1.4 Summary of Activities in Fiscal Year 2002

Implementation plan in fiscal year 2002 is shown in Appendix Figure 1.4-1.

(1) Monitoring and Evaluation of Dissemination Project Operation

Study Team carried out monitoring in the Sixth Field Survey. Final monitoring was done by Study Team in January 2003. Periodical monitoring was performed by Counterpart and the results were reported to Study Team.

(2) Formulation of Master Plan

Incorporating results obtained through first to fifth Site Survey, Study Team prepared Interim Report. Incorporating discussion results in 6th Site Survey and monitoring results, Study Team formulated Draft Final Report. Draft Final was forwarded in December 2002 and final discussion was held in February 2003. Incorporating the monitoring and discussions results in 7th Site Survey, Final Report was prepared and delivered in March 2003.

Fiscal Year	2000									2001													2002												
Month	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
	The First Year									The Second Year													The Third Year												
Stage of the Study	Phase 1 : Basic Study									Phase 2 : PV Dissemination Project													Phse 3 : Establishment of Master Plan												

Japanese Study Team

In Japan

① Preliminary Work in Japan
- a. Collection of the related information
- b. Study on similar PV electrification project
- c. Drafting up and delivery of Inception Report
- d. Preparation for the 1st Workshop

③ The 1st Preparatory Work in Japan
- a. Formulation of a scheme for promotion of rural electrification
- b. Formulation of optimum local electrification program
- c. Formulation of a system design and policy for PV dissemination
- d. Derivation of policy for reform of PV related technology
- e. Formulation of a human resources development plan
- f. Formulation of a PV rural electrification business plan
- g. Formulation of a financial plan
- h. Policy for Dissemination Project
- i. Preparation for the 2nd Workshop

⑤ The 2nd Preparatory Work in Japan
- a. ~~Assistance for purchasing of PV system done by JICA~~
- b. ~~Preparation of operation & maintenance manuals (in English)~~
- c. Preparation of Progress Report
- d. Preparation for the 1st Seminar
- e. Assistance for reception of counterpart trainees invited by JICA

⑨ The 3rd Preparatory Work in Japan
- a. Preparation of Interim Report
- b. Assistance for reception of counterpart trainees invited by JICA
- c. Preparation for the 3rd Workshop

⑪ The 4th Preparatory Work in Japan (Planned, Revised)
- a. Preparation of Draft Final Report
- b. Preparation for the 2nd Seminar

In Botswana

② The 1st Field Survey
- a. Collection of related information
- b. The 1st Workshop
- c. Socio-economic survey of rural villages
- d. Study on formulation of a scheme for promotion of rural electrification
- e. Study on formulation of optimum local electrification program
- f. Study on formulation of a system design and policy for PV dissemination
- g. Study on derivation of policy for reform of PV related technology
- h. Study on formulation of a human resources development plan
- i. Study on formulation of a PV rural electrification business plan
- j. Study on formulation of a financial plan
- k. Study on policy for Dissemination Project

④ The 2nd Field Survey
- a. Socio-economic survey of rural villages
- b. The 2nd Workshop
- c. ~~Finalizing the policy for Dissemination Project and preparation for purchasing and installation of PV system~~

⑥ The 3rd Field Survey (Planned, Actual)
- a. Discussion on Progress Report
- b. ~~Translation of manuals into Setswana language~~
- c. ~~Preparation and start up of Validation Project~~
- d. The 1st Seminar
- * **Nomination of Implementation Body**
- * **End-user contract and collection deposit money**
- * **Tender call for PV system installation**
- * **Contract of PV System Installation**

⑦ The 4th Filed Survey (Planned, Actual)
- a. ~~Monitoring of Dissemination~~
- * ~~Project operation~~
- * **Kick-off Works Installation supervision**

⑧ The 5th Field Survey (Planned, Actual)
- a. ~~Dissemination Project site visit inviting government officers and personel related to PV dissemination~~
- b. ~~Evaluation of Dissemination Project~~
- c. Review and revision of a scheme for promotion of rural electrification
- d. Review and revision of optimum local electrification program
- e. Review and revision of a system design and policy for PV dissemination
- f. Review and revision of policy for reform of PV related technology
- g. Review and revision of a human resources development plan
- h. Review and revision of a PV rural electrification business plan
- i. Review and revision of a financial Plan
- j Dissemination Project site visit inviting government officers and personel related to PV dissemination
- * **Acceptance of the PV system from the Contractor**
- * **Organization setup and start up of Dissemination Project**
- * **Preparation of necessary manuals and translation into Setswana language**

⑩ The 6th Field Survey (Planned, Revised)
- a The 3rd Workshop
- b Finalizing b. to i. In ⑧
- c Drafting up Master Plan for PV rural electrification
- d Final follow-up of the PV Pilot Project
- e Preparation a Website
- * **Monitoring and evaluation of Dissemination Project operation**

⑫ The 7th Field Survey-1 (Planned, Revised)
- * **Dissemination Project**
- * **The 2nd Monitoring**

⑫ The 7th Field Survey-2 (Revised)
- * **Final follow-up of the Dissemination Project**
- a. Discussion on Draft
- b. Final Report
- The 2nd Seminar

Socio-economic Survey		Planned / Actual
Tender and Contract for PV systems		Planned / Actual
Installation		Planned / Actual
Monitoring		Planned / Revised
Report		△ IC/R, △ PR/R, △ IT/R, △ DF/R, △ F/R
Technical Transfer	in Botswana	△ (Workshop - 1), △ (Workshop - 2), △ (Seminor - 1), △ (Workshop - 3), △ (Seminor - 2)
	in Japan	△ OJT-1, △ OJT-2

Appendix Figure 1.4-1 Flow Chart of Entire Study