

Appendix Document 6

Appendix Document 6.2-1 Terms of Reference

1. Project Name:

The Master Plan Study on Photovoltaic Rural Electrification in Botswana Socio-Economic Survey for Rural Village

2. Project Background and Objective of Survey

Botswana Government has emphasized a policy of promoting the photovoltaic electrification to the rural villages with low population density which are located far from existing electric power grid, because of operational and financial constraints of the expansion of the national electric grid for these villages.

However, an implementation program could not be formulated due to the lack of a maintenance structure for PV systems, immature system formation technique, and a shortage of engineers and technicians.

Under this situation, JICA (Japan International Cooperation Agency) undertook Project Formation Study Work in 1997 and Preparatory Study Work in February 2000 in response to the request of Botswana Government to study the viability of dissemination project for PV rural electrification and concluded that the viability and the effects of this project are high.

The objective of this Study is to formulate a master plan for the dissemination of PV rural electrification. The master plan is to provide for PV electrification program covering the entire nation's rural villages (approximately 400 villages) and also is to include assignment of priority to certain PV electrification projects.

For this purpose the potential demands of PV rural electrification will be evaluated, investigating the Socio-Economic conditions in certain numbers of rural villages in Botswana, which will be incorporated in the master plan.

In addition to the above, pilot project will be carried out in three rural villages to validate the prospects for promotion of the diffusion of PV systems in rural areas. 100 sets of PV system for each village will be supplied to applicants for this pilot project. This survey work also includes socio-economic survey for the applicants of the project.

3. Scope of Works of the local consultant

3-1 Scope of works

3-1-1 Preparation of Questionnaire (in English) for

- 1) Households in non- electrified rural villages indicated in 3-2-1
- 2) PV electrified Households indicated 3-2-2
- 3) Public facilities (ex. Primary school, clinic) in non-electrified rural villages indicated in 3-2-1

The objective of Questionnaire is to evaluate the correlation between the potential demands of PV rural electrification and the willingness/ability to pay for the end-users in the rural villages, investigating actual socio-economic conditions of the rural villages. For this context the Questionnaire is to include the following questions at minimum.

For 1) Households in non- electrified rural villages

- a) Household head's particulars (education levels, occupation, sex, ages etc)
- b) Housing information (Ownership, Number of rooms, type of housing etc)
- c) Economic status of the household (status of employment, income and its source, frequency of income, saving amount, expenditure structure etc.)
- d) Owned appliances (radio, TV, Refrigerator, stove, lighting etc.)
- e) Energy expenditure structure (Energy source for lighting, heating, cooking, Power source for electric appliances etc.)
- f) Awareness on PV systems
- g) Willingness and Ability to pay for PV system (initial payment portion and monthly payment portion)

For 2) PV electrified Households

- a) to e) same as the above 1)
- f) Owned PV system (size, Installed year, payment terms etc.)
- g) Maintenance conditions of PV system (annual maintenance cost, frequency and type of system troubles etc.)
- h) Life style after introducing PV system

For 3) Public facilities in non- electrified rural villages

- a) Information on the Public facilities (Number of pupil, Number of Class room, Number of clinic consultation room, Number of clinic employees, Number of outpatients etc.)

- b) Financial status(budget and its source, expenditure structure etc.)
- c) Energy expenditure structure (Energy source for lighting, heating, Power source for electric appliances etc.)
- d) PV systems, if exists. (size, Installed year, payment terms etc.)
- e) Owned appliance((radio, TV, Refrigerator, stove, lighting etc.)
- f) Maintenance conditions of PV system, if exists. (annual maintenance cost, frequency and type of system troubles etc.)
- g) PV system required (size, quantity, etc.)
- h) Willingness and Ability to pay for PV system (initial payment portion and monthly payment portion)

Note) Bidder shall complete the questionnaire paper, referring to Attachment 2 , which is prepared by JICA team for above 1) and 2).

3-1-2 Translation to local language (Setswana), if necessary

3-1-3 Printing (Copying) of Questionnaire

3-1-4 Interview the respondent of Local Households and public facilities in the selected villages on the Questionnaire Paper

3-1-5 Analysis of Collected Data in Questionnaire Paper

3-1-6 General outline information on the non- electrified rural villages indicated in 3-2-1, which includes population of the village, number of households, current situation of infrastructure and theft and activities of Co-op, if exists.

3-1-7 Assignment of three interviewers for 3 weeks (from end of January to middle of February 2001) for Socio-Economic survey to the applicants in the villages where the Pilot Project is carried out. (Refer to Attachment 3)

3-2 Location and sample numbers to be surveyed

3-2-1 Non-Electrified Villages:

Villages to be surveyed:

Total 10 villages, village list to be referred in the attachment 1

Number of samples: approximately 50 samples(households and small business) per each village, total 500 samples

3-2-2 PV Electrified Households :

Total number of samples : 50

According to RIIC (Rural Industries Innovation Center),who is executing National Photovoltaic Rural electrification Programme (NPVREP), 291 PV

systems have been installed in the rural households in Botswana. The local consultant shall select appropriate households from PV electrified households out of aforementioned households.

3-2-3 Public facilities

Primary School, Clinic in the villages shown in the attachment 1

3-3 Documents to be submitted

Bidder is to be required to submit the following document by the closing date of this tender

- 1) Company brochure and reference list for the similar survey project
- 2) Information on Survey team formation and survey schedule
- 3) Quotation

Bidder's quotation should include the price breakdown as follows

- a. Cost for finalizing the questionnaire
 - b. Cost with Bidder's man-hour rate per day and numbers of man-hour for carrying out of such survey
 - c. Transportation Fee
 - d. Other expenses, etc
- 4) Other information if necessary

3-4 Schedule

- 1) Tender closing date : October 6, 2000 15:00

Bidder's documents should reach to

Mr. M. Hirose c/o Energy Affair Division of Ministry of Minerals Energy and Water Resources by the above time (FAX or E-Mail are accepted)

Tel: Gaborone 314221 ext. 230

Fax Gaborone 314201

E-mail mhirose@gov.bw

- 2) Subcontract:

After receiving the Bidder's documents, Bidder's documents will be evaluated from the commercial and technical view points. Then the negotiating order to the Bidders will be decided.

When the Contracting conditions are mutually agreed with the first negotiation positioned company, Contract will be awarded to the company, if failed, next positioned company will have a right to negotiate the contract with JICA team.

Subcontract is planned to be concluded by Middle of October, 2000

3) Questionnaire paper

Awarded bidder should submit the draft questionnaire paper to JICA team within one week after the contract

4) Socio-economic Survey: To be completed by end of November 2000

5) Report : Interim report by middle of December, 2000

(Deliverables to be submitted in the form of E-mail)

E-Mail Address: M.Hirose@unico-intl.co.jp (Japan)

Final report: by middle of January, 2001

(Deliverables to be submitted in the form of E-mail and 20 hard copies)

6) Payment Terms

First payment :

Forty percent of contract amount upon signing the contract as the down payment

Final payment:

Sixty percent of contract amount upon submission and approval of final report

Attachment 1 Survey village list

Attachment 2 Questionnaire paper(for reference)

Attachment 3 Assignment schedule of three interviewers for 3 weeks

Appendix Document 6.2-2 Questionnaire Paper

Questionnaire for Non-PV Electrified Households

Questionnaire for Non-PV Public Facilities

Questionnaire for PV Electrified Households

Questionnaire Informal

JAPANESE INTERNATIONAL COOPERATION AGENCY

&

MINISTRY OF MINERALS, ENERGY AND WATER RESOURCES

□
**THE MASTER PLAN STUDY ON PHOTOVOLTAIC RURAL
ELECTRIFICATION IN BOTSWANA**

SOCIO-ECONOMIC SURVEY FOR RURAL VILLAGES

QUESTIONNAIRE SURVEY

Non-PV Electrified Households

November, 2000

EECG Consultants Pty Ltd
Energy Environment, Computer and Geophysical Applications

Contact Person

Dr Peter. P. Zhou
Director (EECG)
PO BOX 402339
GABORONE
BOTSWANA
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email:pzhou@global.bw

Name of Interviewer		Survey Date	
District		Interview time	:
Ward Area		Name of Respondent	

- 1=Dutlwe 2=Gojwane 3= Kudumetse 4=Khakwe
5= Kule 6= Lorolwane 7= Makalamabedi 8= Molthabaneng
9=Parakarungu 10=Oliphants's Drift

1. HOUSEHOLD HEAD

1.1 Name of Household head-----

1.2. Gender

1. Male _____
2. Female _____

1.3 Age _____

1.4 Marital Status

1. married
2. single _____
3. divorced
4. widowed/widowered
5. Living together
6. Other-----

1.5 Education

1. No education
2. Primary _____
3. Secondary
4. Tertiary
5. Other

1.6 Occupation

1. not employed
2. formally employed _____
3. self employed
4. pensioned
5. Other

2. HOUSING DETAILS

2.1 Ownership

1. Owned
2. Rented _____
3. Other

2.2. No. of family members _____

2.3 Type of household

1. Detached
2. lolwapa _____
3. Other-----

2.4 Actual members living in household

1. Total
2. Adults
3. Youths
4. school going
5. Toddler

2.5 No. of Rooms

1. sleeping
2. entertainment/eating
3. kitchen
4. Other-----

2.6. No. of points requiring regular lighting _____

3. LIVESTOCK AND CROPS

3.1 How many cattle do you have ?

1. none
2. 1 to 10 _____
3. 11 to 20
4. 21-50
5. 51-100
6. over 100

3.2 How many small livestock do you have?

1. none
2. 1-20 _____
3. 21-50
4. 51-100
5. 101-200
6. over 200

3.3 Do you grow crops?

- 1. YES
- 2. NO

3.4. Was the last season good year for crops?

- 1. Good
- 2. average/normal
- 3. Poor
- 4. N/A

3.5 No. of bags harvested last year

- 0=none
- 1. 1to 5
- 2. 6-10
- 3. 11-15
- 4. over 15
- 5.N/A

4.0 INCOME SOURCES

4.1 Income Sources	Rank sources 1=main, 2=2 nd , 3=3 rd ,	How often 1=monthly, 2=every 3 months, 3=every 6 months, 4= annually; 5=sometimes	Amount in Pula per period. 0=none, 1=1-100; 2=101-200; 3= 201-300; 4=301-500; 5=501=1000; 6= 1001-1500; 7=over 1500
1. Salary/wage			
2. Remittance			
3. self employment			
4. rent			
5. pensions			
6. sale of livestock			
7. sale of agricultural produce			
8. Other-----			

4.2 How many other H/H members bring income?

- 1. Spouse
- 2. son(s)
- 3, daughter(s)
- 4. Other-----
- 5. None

4.3 Other Household Possessions?

- 1. Scotch carts
- 2. cars/vehicle
- 3. bicycles
- 4. Other-----
- 5. None

5. EXPENDITURE BREAKDOWN

5.1 Who pays for household budgets

- 1. Household head
- 2. spouse
- 3. working sons/daughters
- 4. Other-----

5.2 EXPENDITURE/Month

0=nothing; 1=uptoP50; 2=51-100; 3=101-150; 4=151-200; 5=201-300; 6=over P300

1. Food	<input type="text"/>	4. clothes	<input type="text"/>	7. health	<input type="text"/>
2. rent	<input type="text"/>	5. energy	<input type="text"/>	8. Other -----	<input type="text"/>
3. school fees	<input type="text"/>	6. entertainment	<input type="text"/>		<input type="text"/>

5.3. How much money (if any) is left after your monthly expenditure?

1. None
2. P1-50
3. P51-100
4. P101-200
5. P201-300
6. Over P300
- 7 N/A

5.4 How is this amount disposed?

1. saved for purpose
2. saved for emergency
3. Other-----
4. N/A

6. ENERGY & BUDGET

6.1 What are fuels for lighting	Rank main=1; 2 nd =2nd 3 rd =3	For how long has fuel been used 1=1-2 yrs; 2=2-5yrs; 3=over 5 yrs	Cost(P/m) 1=upto P10; 2=P11-P20; 3=P20-P30; 4=P30-P50; 5=over P50
1. Firewood			
2. Kerosene/paraffin			
3. Candles			
4. LPG/gas			
5. Generator			
6. Battery			
7. Others-----			

7. OWNED APPLIANCES AND ENERGY SOURCE

7.1 ITEM	MAIN ENERGY SOURCE 1=dry battery, 2=liquid battery, 3=LPG, 4=paraffin; 5=generator	USE/DAY (HRS) 1= upto 1hr 2=1-2 hrs 3=2-4 hours; 4=over 4 hrs	Amount spent on energy for appliance (P/m) 1=1-20; 2=21-50; 3=overP50
1. Radio			
2. TV 1. Black & white or 2. Colour			
3. Refrigerator			
4. Lamps			
5. Other-----			
Other appliances wish to buy?			
1.			
2.			
3.			

8.0 AWARENESS ON PV

8.1 Do you know solar PV?

1=YES

2=NO

8.2 If Yes how did you know?

1. Used
2. Seen
3. heard
4. read
5. Others-----
- 6 N/A

8.3 What do you think is the best way for people to know about solar PV systems?

1. Demonstration of solar PV
2. radio programmes
3. Kgotla presentations
4. newspaper articles
5. Other-----

9. WILLINGNESS TO PAY

9.1 Would you like to use solar PV system?

1=YES

2=NO

9.2 If NO why don't you want to use PV system?

1. Not necessary/prefer alternative sources
2. Necessary but cost too high
3. Need more information
4. Other-----
5. N/A

9.3 If You want to use solar PV system For what end use?

1. lighting only
2. electric appliance only
3. lighting and electric appliance
4. Other-----
5. N/A

9.4 If for lighting how many points do you want to light?

9.4.1 Light points to be light

1. 1 to 2 points
2. 2 to 3 points
3. 3 to 4 points
4. 5-6 points
5. over 6 points
6. none

9.4.2

1. No. of Hours

2. N/A

9.5 If electric appliances what electric appliance do you want to power

- 1. radio
 - 2. Black and white TV
 - 3. Colour TV
 - 4. Refrigerator
 - 5. Other
 - 6. N/A
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9.6 What other activities (e.g. income generating) would you consider for solar PV

- 1. charging batteries
 - 2. lighting chicken runs
 - 3. cooling drinks for sale
 - 4. lighting for hair plating at night
 - 5. Sewing machine
 - 6. Other-----
 - 6. None
- | |
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9.7 What are your reasons for wanting to buy solar PV system?

- 1. better and clean lighting
 - 2. entertainments from appliances
 - 3. lack of other conventional fuels
 - 4. saves money
 - 4. Other-----
 - 5. N/A
- | |
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9.8 If willing to use; Why are you currently not using PV?

- 1. Still saving for the system
 - 2. Dont know where to buy it
 - 3 Dont know how much it costs
 - 4. Dont know about the system
 - 5. need to see it working
 - 6. Other-----
 - 7. N/A
- | |
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9.9 Who in your house would decide and pay for system?

- 1. Household head
 - 2. spouse
 - 3. working sons/daughter
 - 4 Family contributions
 - 5. Other-----
 - N/A
- | |
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9.10 How soon can that decision be made?

- 1. Immediately/Soon
 - 2. Needs further consideration
 - 3. Later/next year
 - 4. Don't know
 - 5. N/A
- | |
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9.11 If you could afford which of the following would you buy?:

Rank 1=most preferred; 2=2nd choice; 3=3rd choice:

- | | |
|--------------------|--------------------------|
| 1. Solar PV system | <input type="checkbox"/> |
| 2. Borehole | <input type="checkbox"/> |
| 3. Scotch cart | <input type="checkbox"/> |
| 4. Cattle | <input type="checkbox"/> |
| 5. Clothes | <input type="checkbox"/> |
| 6 Other----- | <input type="checkbox"/> |
| 7 N/A | <input type="checkbox"/> |

9.12 If your current expenditure on fuels for lighting and appliances is enough to pay for solar PV monthly instalments which energy source would you prefer?

- | | |
|------------------|--------------------------|
| 1. Current fuels | <input type="checkbox"/> |
| 2. Solar PV | <input type="checkbox"/> |
| 3. Other | <input type="checkbox"/> |
| 4. N/A | <input type="checkbox"/> |

10. ABILITY TO PAY

10.1 Which solar PV system size would you want to buy?

- | | |
|--|--------------------------|
| 1. 2 light (12W) | <input type="checkbox"/> |
| 2. 3 to 4 light system (25W) | <input type="checkbox"/> |
| 3. 6 lights + small radio (50Wp) | <input type="checkbox"/> |
| 4. 3 to 4 lights + Black & white TV (100W) | <input type="checkbox"/> |
| 5. 3 to 4 lights +colour TV (150W) | <input type="checkbox"/> |
| 6. 3 to 4 lights + Fridge (>200W) | <input type="checkbox"/> |
| 7. N/A | <input type="checkbox"/> |

10.2 Past system price ranges from RIIC project show the following price ranges- Please tick maximum Deposit and instalments which you can pay? Year 2000 prices

System sizes	Price ranges + installation etc. (PULA).	Estimated deposit (PULA)	Estimated monthly instalments (over 4 years) (Pula)
1. 12W	1200	200-300	<input type="checkbox"/> 30-50
2. 25W	2500-P3250	300-500	<input type="checkbox"/> 50-100
3. 50W	5500-7500	500-800	<input type="checkbox"/> 100- 150
4. 100W	6900-8300	800-1000	<input type="checkbox"/> 150-200
5. 150W	10100-10300	1000-1500	<input type="checkbox"/> 200-250
6. 200W	11900-12000	1500-2000	<input type="checkbox"/> 250-300
7. 300W	14900-16250	2000-2500	<input type="checkbox"/> 300-400
8. 350-400W	15100-20 000	2500-3000	<input type="checkbox"/> 400-600
9.		None of these	<input type="checkbox"/> none of these

10.3 IF you can't pay the amounts in Table what maximum deposit and monthly instalment can you pay.

- | | |
|--------------------|----------------------------|
| Deposit | <input type="checkbox"/> |
| P | <input type="checkbox"/> |
| Monthly instalment | P <input type="checkbox"/> |
| N/A | <input type="checkbox"/> |

10.4 Which source of income will you use?

- 1. salary/wage
- 2. remittances
- 3. savings
- 4. pensions
- 5. Other
- 6 N/A

10.5 How would you want to make payments?

- 1. cash
- 2. In instalments

10.6 If in Instalments-How often can you pay in instalments for solar PV?

- 1. monthly
- 2. every 3 months
- 3. every 6 months
- 4. Other
- 5 N/A

10.7 How long do you think it will take you to pay for your solar system? Yrs

10.8 Would you sell cattle for solar PV system? 1.Yes; 2.NO; 3. N/A

11.0 Pay for service

There are two schemes of electricity utilization by PV system for end-users. One is purchasing PV equipment by end-users. This is popular case and the end-user possesses PV equipment, however maintenance of PV system should be done by the end-user.

The other is the scheme of “pay for service”. The end-use will purchase electricity generated by PV system which is owned by others. The end user cannot possess PV equipment, however the maintenance of PV equipment will be done by others.

11.1 Which scheme would you prefer?

- Scheme A (Purchasing PV equipment)
- Scheme B (Pay for service)

Willingness to participate in Government and JICA’s Pilot project

Government and JICA(Japan International Cooperative Agency) will carry out Master Plan Study on Photovoltaic Rural Electrification in Botswana. In this connection both parties plan to implement the pilot project applying the above scheme B “Pay for service” in certain rural villages to validate the prospects for promotion of the diffusion of PV systems in rural areas, installing PV system for applicants for this pilot project.

11.2 Are you interested to participate in this pilot project?

- 1. YES
- 2. NO

11.3 If No, why -----

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ELECTRIFICATION IN BOTSWANA**

SOCIO-ECONOMIC SURVEY FOR RURAL VILLAGES

QUESTIONNAIRE SURVEY

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November, 2000

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Name of Interviewer		Survey Date	
District		Interview time	: :
Village name Ward Area		Respondent's name	

- 1=Dutlwe 2=Gojwane 3= Kudumetse 4=Khakwe
5= Kule 6= Lorolwane 7= Makalamabedi 8= Molthabaneng
9=Parakarungu 10=Oliphants's Drift

1. PUBLIC FACILITY HEAD

1.1. Name of Public facility Head----- Role-----

1.2 Gender

1. Male
2. Female

1.3 Age

2. PUBLIC FACILITY

2.1 Type of facility

1. Clinic
2. Primary School
3 Other
4. Kgotla
5. Polic4
6. Other-----

2.2 Ownership

1. Government
2. council
3. community
4. private
5. other
6. Other-----

2.3 Quantities

If School No. of Pupils----- No. of Teachers----- No. of Other staff-----	If Clinic/hospital No. of outpatients----- No. of in-patients----- No. of staff-----	Other What products/service provided----- No. of products produced----- No. of Employees-----
If School No. of classrooms----- No. of libraries----- No. of offices----- No. of Teachers Houses-----	Clinic/Hospital No. of consultation rooms----- No. of wards (if any)----- No. of offices----- No. of staff houses-----	Other No. of offices----- size of warehouse----- Other rooms-----

3. FINANCING STATUS

3.1 Which is the main financing source for the facility?

1. Government
2. council
3 community
4. private
5. Other-----

3.2 What are the other sources of Financing?

- 1. charging for services/fees
- 2. Fund raising
- 3. donations
- 4. other-----
- 5. none

Size of annual Income/budget

4.0 EXPENDITURE/Month

4.1 What are your direct general expenditure?

1=uptoP50; 2=51-100; 3=101-150; 4=151-200; 5=201-300; 6=over P300

- 1. Water
- 2. Energy
- 3. Other-----
- 4. None

4.2 How much is saved after expenditure?

- 1. none
- 2. Upto P500
- 3. P500-P1000
- 4. P1001-P2000
- 5. P2001-3000
- 6. P3000-P5000
- 7. Over P5000

4.3 How is this amount disposed?

- 1. carried over to next financial year
- 2. returned to financier
- 3. Other
- 4. N/A

5. ENERGY & BUDGET

5.1 What are the fuels used for lighting	Rank main=1; 2 nd =2 and 3 rd =3	How long used 1=1-2years, 2=2-5 yrs, 3=over 5 yrs	Cost(P/m) 1=upto P100 2=101-200; 3= 201-300 4=over P300
1.Firewood			
2.Kerosene/paraffin			
3.Candles			
4.LPG/gas			
5.Generator			
6.Battery			
7. Others-----			

6. OWNED APPLIANCES AND ENERGY SOURCE

6.1 ITEM	MAIN ENERGY SOURCE. 1=dry battery 2=liquid battery; 3=LPG; 4=other-----	USE/DAY (HRS) 1=upto 1hr; 2=1-2hrs 3=2-4hrs; 4=over 4hrs	Amount spent on energy for appliance (P/m) 1=upto P50; 2=51-100; 3=101-200; 4=over 400
Radio			
TV 1. Black & white or 2. Colour			
Refrigerator			
Office equipment e.g. computers			
Lamps			
Other-----			
Other appliances wish to buy 1. 2. 3.			

7. AWARENESS ON PV

7.1 Do you know solar PV?

1=YES 2=NO _____

7.2 If Yes how did you know

- | | |
|----------------|--------------------------|
| 1. Used | <input type="checkbox"/> |
| 2. Seen | <input type="checkbox"/> |
| 3. heard | <input type="checkbox"/> |
| 4. read | <input type="checkbox"/> |
| 5. Others----- | <input type="checkbox"/> |
| 6 N/A | <input type="checkbox"/> |

7.3 What do you think is the best way for people to know about solar PV systems?

- | | |
|------------------------------|--------------------------|
| 1. Demonstration of solar PV | <input type="checkbox"/> |
| 2. radio programmes | <input type="checkbox"/> |
| 3. Kgotla presentations | <input type="checkbox"/> |
| 4. newspaper articles | <input type="checkbox"/> |
| 5. Other----- | <input type="checkbox"/> |

8. WILLINGNESS TO PAY

8.1 Would your Facility like to use solar PV system?

1=YES 2=NO _____

8.2 If NO why not want to use PV system?

- | | |
|---------------------------------------|--------------------------|
| 1. Not necessary/prefer current fuels | <input type="checkbox"/> |
| 2. Necessary but cannot get financing | <input type="checkbox"/> |
| 3. Need more information | <input type="checkbox"/> |
| 4. need to consult financier | <input type="checkbox"/> |
| 4. Other----- | <input type="checkbox"/> |
| 5. N/A | <input type="checkbox"/> |

8.3 If You want to use solar PV system For what end use

- 1. lighting only
 - 2. electrical appliances only
 - 3. lighting and electrical appliances
 - 4. Other-----
 - 5. N/A
- | |
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8.4 If for lighting how many points do you want to light?

8.4.1 Light points to be light

- 1. 1 to 2 points
- 2. 2 to 3 points
- 3. 3 to 4 points
- 4. 5-6 points
- 5. over 6 points
- 6. none

8.4.2 1.No. of Hours
2.N/A

8.5 If electrical appliances what electric appliance does facility want to power

- 1. radio
 - 2. Black and white TV
 - 3. Colour TV
 - 4. Refrigerator
 - 5. Office equipment
 - 5. Other-----
 - 6. N/A
- | |
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8.6 What other activities (e.g. income generating) would you consider for solar PV

- 1. charging batteries
 - 2. lighting chicken runs
 - 3. cooling medicines
 - 4. cooling drinks for sale
 - 5. Sewing machine
 - 7. Other-----
 - 8. N/A
- | |
|--|
| |
| |
| |
| |
| |
| |
| |

8.7 What are facility's reasons for wanting to buy solar PV system?

- 1. better lighting for reading/facility activities
 - 2. for better provision of service
 - 2. entertainment from appliances
 - 3. lack of other conventional fuels
 - 4. Other-----
 - 5. N/A
- | |
|--|
| |
| |
| |
| |
| |
| |

8.8 Why are you currently not using PV?

- 1. Still saving for it
 - 2. Dont know where to buy it
 - 3 Dont know how much it costs
 - 4. Dont know about the system
 - 5. need to see it working
 - 6. Other-----
 - 7. N/A
- | |
|--|
| |
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| |
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| |
| |
| |

8.9 Who in your facility would decide and pay for system?

- 1. Facility Head
- 2. Financier e.g. council/ Owner
- 3. Donors
- 4 Other-----

8.10 How soon can that decision be made?

- 1..Immediately/soon
- 2. Needs consultation with financier
- 3 needs further consideration _____
- 4. Next year
- 5. dont know
- 6. N/A

8.11 What would you prefer to pay for among the following- in order of preference?:rank 1st, 2nd 3rd.

- 1. Solar PV system
- 2. Borehole
- 3. New Furniture
- 4 Other-----
- 4 N/A

8.12 If your current monthly fuel expenditure is enough to pay for solar PV system of similar energy capacity Which would you choose?

- 1. Current fuel
- 2. solar PV
- 3. Other-----
- 4. N/A

9.0 ABILITY TO PAY

9.1 Which solar PV system size would the facility want to buy?

- 1. 2 light (12W)
- 2. 3 to 4 light system (25W)
- 3. 6 lights + small radio (50Wp)
- 4 3 to 4 lights + Black & white TV (100W)
- 5 3 to 4 lights +colour TV (150W)
- 6. 3 to 4 lights + Fridge (>200W)
- 6 N/A

9.2 Past system price ranges from RIIC project show the following price ranges- Please tick maximum Deposit and instalments which Facility can pay? Year 2000 Prices

System sizes	Price ranges + installation etc. (PULA).	Estimated deposit (PULA)	Estimated monthly (over 4 years) instalments (Pula)
1. 12W	1200	200-300	<input type="checkbox"/> 30-50
2. 25W	2500-P3250	300-500	<input type="checkbox"/> 50-100
3. 50W	5500-7500	500-800	<input type="checkbox"/> 100- 150
4. 100W	6900-8300	800-1000	<input type="checkbox"/> 150-200
5. 150W	10100-10300	1000-1500	<input type="checkbox"/> 200-250
6. 200W	11900-12000	1500-2000	<input type="checkbox"/> 250-300
7. 300W	14900-16250	2000-2500	<input type="checkbox"/> 300-400
8. 350-400W	15100-20 000	2500-3000	<input type="checkbox"/> 400-600
9.		None of these	<input type="checkbox"/> none of these

9.3 IF you can't pay the amounts in Table what maximum deposit and monthly instalment can facility pay.

Deposit	
P	
Monthly instalment	
N/A	

9.4 Which source of income will the Facility use?

1. Budget allocation	
2. savings	
3. donations	
4. fund raising	
5. Other-----	
6 N/A	

9.5 How would the Facility want to make your payments?

1. cash	
2. monthly	
3. every 3 months	
4. every 6 months	
5. Other	
6 N/A	

9.6 How long do you think it would take you to pay for your solar system?

Yrs

10.0 Pay for service

There are two schemes of electricity utilization by PV system for end-users. One is purchasing PV equipment by end-users. This is popular case and the end-user possesses PV equipment, however maintenance of PV system should be done by the end-user.

The other is the scheme of "pay for service". The end-use will purchase electricity generated by PV system which is owned by others. The end user cannot possess PV equipment, however the maintenance of PV equipment will be done by others.

10.1 Which scheme would your facility prefer?

Scheme A (Purchasing PV equipment)	
Scheme B (Pay for service)	

Willingness to participate in Government and JICA's Pilot project

Government and JICA(Japan International Cooperative Agency) will carry out Master Plan Study on Photovoltaic Rural Electrification in Botswana. In this connection both parties plan to implement the pilot project applying the above scheme B "Pay for service" in certain rural villages to validate the prospects for promotion of the diffusion of PV systems in rural areas, installing PV system for applicants for this pilot project.

10.2 Is the facility interested to participate in this pilot project?

1. YES	
2. NO	

10.3 If No, why -----

JAPAN INTERNATIONAL COOPERATION AGENCY

&

MINISTRY OF MINERALS, ENERGY AND WATER RESOURCES

**THE MASTER PLAN STUDY ON PHOTOVOLTAIC RURAL
ELECTRIFICATION IN BOTSWANA**

SOCIO-ECONOMIC SURVEY FOR RURAL VILLAGES

**QUESTIONNAIRE
INFORMAL**

Nov, 2000

Prepared by

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Date of Interview	Name of Interviewer
Name of Respondent	Role of Respondent

LOCATION

- 1=Dutlwe 2=Gojwane 3= Kudumetse 4=Khakwe
5= Kule 6= Lorolwane 7= Makalamabedi 8= Molthabaneng
9=Parakarungu 10=Oliphants’s Drift

DECISION MAKING FRAMEWORK

iv) How are District/ village structures organized and who are the key decision makers?

PV SYSTEMS- DISSEMINATION STRATEGY

1. How far is nearest supplier of solar PV in your District/ Village?

2. Do you think people are aware where to buy solar PV systems?

3. Would solar PV be of interest in your District/Village?

4. What do you think is required for people to acquire solar PV systems?

5. What is the critical hinderance for people to acquire solar PV systems?

6. What can be done to facilitate acquisition of solar PV systems?

7. What are your experiences with solar PV dissemination in Botswana?

8. What do you consider to be the critical issues/problems to be addressed for solar PV dissemination in your District/Village?

9. What is already being addressed?

10. Who is best placed to make this possible?

11. What is NOT being addressed?

12. What role can your institution play to enhance solar PV uptake?

13. Would your District/Village be interested to participate in the Pilot Project to disseminate solar PV early Next Year? and How can you support that initiative?

14. Who in your opinion is best placed to be the Execution Body for dissemination of solar PV in rural villages?

- 1 Energy Affairs Division
- 2 Botswana Power Corporation
- 3 Rural Industries Innovation Centre
- 4 Local Authorities
- 5 Private Sector
- 6 Other

Please give your reasons for choosing the institutions

15. If local authorities take role of execution bodies- how would they go about PV electrification/dissemination of PV systems in their Districts/Villages?

16. How would authority be allocated between Local Government Authorities and Traditional authorities?

17. What role can be played by the other institutions- mention institutions and say what they can do.

18. Is an idea of a national PV Committee (s) to advise PV electrification important?

19. Who do you think should be in this committee?

SOCIAL LIFE IN DISTRICT/VILLAGE

1. What are the prevalent social life activities in your District/village. especially those which require lighting- beer drinking, church activities, community gatherings etc.

2. What is the level of crime in your District/village?

3. What sort of crime is committed in your District/village?

4. Would there be a threat of solar PV theft in your viullage?

5. Has such or similar theft occured in your District/villages?

6. Is the theft situation getting better or worse?

7. What can be done to address the theft situation?

OBSERVATIONS/DATA

1. What energy fuels are in prevalent use in the village?

2. Are prices of various energy fuels/sources in the village

Paraffin/litre
LPG/kg
Fuelwood/kg
Diesel/litre

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□
**THE MASTER PLAN STUDY ON PHOTOVOLTAIC RURAL
ELECTRIFICATION IN BOTSWANA**

SOCIO-ECONOMIC SURVEY FOR RURAL VILLAGES

QUESTIONNAIRE SURVEY

PV Electrified Households

November, 2000

EECG Consultants Pty Ltd
Energy Environment, Computer and Geophysical Applications

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Name of Interviewer		Survey Date	
District		Interview time	: :
Village name		Name of Respondent	
Ward Area			

1. HOUSEHOLD HEAD

1.1 Name of Household head-----

1.2. Gender

1. Male
 2. Female

1.3 Age

1.4 Marital Status

1. married
 2. single
 3. divorced
 4. widowed/widowered
 5. Living together
 6. Other-----

1.5 Education

1. No education
 2. Primary
 3. Secondary
 4. Tertiary
 5. Other

1.6 Occupation

1. not employed
 2. formally employed
 3. self employed
 4. pensioned
 5. Other

2. HOUSING DETAILS

2.1 Ownership

1. Owned
 2. Rented
 3. Other

2.2. No. of family members

2.3 Type of household

1. Detached
 2. lolwapa
 3. Other-----

2.4 Actual members living in household

1. Total
 2. Adults
 3. Youths
 4. school going
 5. Toddler

2.5 No. of Rooms

1. sleeping
 2. entertainment/eating
 3. kitchen
 4. Other-----

2.6. No. of points requiring regular lighting

3. LIVESTOCK AND CROPS

3.1 How many cattle do you have ?

1. none
 2. 1 to 10
 3. 11 to 20
 4. 21-50
 5. 51-100
 6. over 100

3.2 How many small livestock do you have?

1. none
 2. 1-20
 3. 21-50
 4. 51-100
 5. 101-200
 6. over 200

3.3 Do you grow crops?

- 1. YES
- 2. NO

3.4. Was the last season good year for crops?

- 1. Good
- 2. average/normal
- 3. Poor

3.5 No. of bags harvested last year

- 0. none
- 1. 1 to 5
- 2. 6-10
- 3. 11-15
- 4. over 15
- 5. N/A

4.0 INCOME SOURCES

4.1 Income Sources	Rank sources 1=main, 2=2 nd , 3=3 rd ,	How often 1=monthly, 2=every 3 months, 3=every 6 months, 4= annually; 5=sometimes	Amount in Pula per period. 0=none, 1=1-100; 2=101-200; 3= 201-300; 4=301-500; 5=501=1000; 6= 1001-1500; 7=over 1500
1. Salary/wage			
2. Remittance			
3. self employment			
4. rent			
5. pensions			
6. sale of livestock			
7. sale of agricultural produce			
8. Other-----			

4.2 How many other H/H members bring income?

- 1. Spouse
- 2. son(s)
- 3. daughter(s)
- 4. Other-----
- 5. None

4.3 Other Household Possessions?

- 1. Scotch carts
- 2. cars/vehicle
- 3. bicycles
- 4. Other-----
- 5. None

5. EXPENDITURE BREAKDOWN

5.1 Who pays for household budgets

- 1. Household head
- 2. spouse
- 3. working sons/daughters
- 4. Family contributions
- 4. Other-----

5.2 EXPENDITURE/Month

0=nothing; 1= uptoP50; 2=51-100; 3=101-150; 4=151-200; 5=201-300; 6=over P300

1. Food	<input type="text"/>	4.clothes	<input type="text"/>	7. health	<input type="text"/>
2. rent	<input type="text"/>	5. energy	<input type="text"/>	8. Other -----	<input type="text"/>
3. school fees	<input type="text"/>	6.entertainment	<input type="text"/>		<input type="text"/>

5.3.How much money (if any) is left after your monthly expenditure?

1. None
2. P1-50
3. P51-100
4. P101-200
5. P201-300
6. Over P300
- 7 N/A

5.4 How is this amount disposed?

1. saved for purpose
2. saved for emergency
3. Other-----
4. N/A

6. ENERGY & BUDGET

6.1 What are fuels for lighting	Rank main=1; 2 nd =2 and 3 rd =3	For how long has fuel been used 1=1-2 yrs; 2=2-5yrs; 3=over 5 yrs	Cost(P/m) 1=upto P10; 2=P11-P20; 3=P20-P30; 4=P30-P50; 5=over P50
1. solar PV			
2.Firewood			
3.Kerosene/paraffin			
4.Candles			
5.LPG/gas			
6.Generator			
7.Battery			
8. Others-----			

7. OWNED APPLIANCES AND ENERGY SOURCE

7.1 ITEM	Qty/No.	List ENERGY SOURCES used. 1=solar PV; 2=battery; 3=LPG; 4=paraffin; 5=generator; 6=other	USE/DAY (HRS) 1= upto 1hr 2=1-2 hrs 3=2-4 hours; 4=over 4 hrs	Amount spent on energy for appliance (P/m) 1=1-20; 2=21-50; 3=overP50
Radio				
TV 1. Black & white <input type="checkbox"/> or 2. Colour <input type="checkbox"/>				
Refrigerator				
Lighting				
Lamp				
Other-----				
Other appliances wish to buy 1. 2. 3.				

8.0 PV SYSTEM OWNED

8.1 What system size do you have?

1. 2 light (12W)
2. 3 to 4 light system (25W)
3. 6 lights + small radio (50Wp)
4. 3 to 4 lights + Black & white TV (100W)
5. 3 to 4 lights +colour TV (150W)
6. 3 to 4 lights + Fridge (>200W)

8.2 Would you want to change system ?

1. upgrade system
2. dispose/sell system
3. keep same size
4. Other-----

8.3 If Upgrade what are your reasons?

1. Cater for newer appliances/lighting
2. Present load is heavier
3. Need longer period of supply
4. Other-----
5. N/A

8.4 To what system size would you upgrade system?

1. 2 light (12W)
2. 3 to 4 light system (25W)
3. 6 lights + small radio (50Wp)
4. 3 to 4 lights + Black & white TV (100W)
5. 3 to 4 lights +colour TV (150W)
6. 3 to 4 lights + Fridge (>200W)

8.5 If Dispose what are your reasons?

- 1. Former fuels better than system
- 2. Want to shift to other energy fuels/sources
- 2. System often faulty
- 3. Cannot afford repayments
- 4. Other-----

9.0 HOW DID YOU BUY YOUR PV SYSTEM ?

<input type="checkbox"/> Cash purchase
<input type="checkbox"/> Hire-purchase Down payment: _____ pula Repayment amount _____ pula/month Repayment Period: _____

10.0 HOW IS MAINTENANCE CONDITION AFTER YOU BUY PV SYSTEM?

Average annual maintenance cost: _____ pula
System trouble: _____ times
Type of trouble: ? Shortage of battery liquid <input type="checkbox"/> Voltage fluctuation <input type="checkbox"/> Damage of PV panel <input type="checkbox"/> Damage of PV panel support structure <input type="checkbox"/> Trouble due to insufficient sunshine duration <input type="checkbox"/> Others [-----]

11. 0 PAY FOR SERVICE

There are two schemes of electricity utilization by PV system for end-users. One is purchasing PV equipment by end-users. This is popular case and the end-user possesses PV equipment, however maintenance of PV system should be done by the end-user.

The other is the scheme of “pay for service”. The end-use will purchase electricity generated by PV system which is owned by others. The end user cannot possess PV equipment, however the maintenance of PV equipment will be done by others.

Which scheme do you think is effective to disseminate PV systems.?

- Scheme A (Purchasing PV equipment)
- Scheme B (Pay for service)

12.0 CURRENT LIFE STYLE AFTER INTRODUCING PV SYSTEM

- It is useful in order to do the homework.
- The entertainment has increased.
- The family deepened the knowledge about the world.
- The work became easy to be carried out in the house at night .e.g. in kitchen
- The time of the supper became happy.
- The night security has improved.
- There is no change.
- The family became idle.
- Other-----

13.0 COMMENTS

13.1

- I am very satisfied.
- There is a problem of payment as prices are too high but the system is satisfactory.
- I am dissatisfied.

13.2 If Dissatisfied please give your reasons-----: