

**Appendix 13 PV Rural Electrification Project Planning
Model and Financial/Economic Analysis**

Appendix Table 13.2-1 Assumption (Base Case A-1)

The Master Plan Study for PV Electrification in Botswana
Financial Calculation

Assumption

1. PV System Configuration

1) Solar Home System	Capacity	50wp	1 pce
	Accessory	Battery (102Ah)	1 pce
2) Concentrated PV system	Capacity	500wp	
	Accessory	Battery (102Ah x 10)	1 lot
3) Battery Charge Station system			
Base Design Configuration	Capacity	500Wp	
	Accessory	Battery (30Ah)	36 pcs as Spare
Households covered by this system			30 households/System 20% of total households
BCS are installed in every village and locality on propotional design configuration to Base Design.			
BCS Capacity per user (Wp/HHs)			16.7
Battery spare			120% of BCS households

Coverage rate and number of households applied are based on the above figure.

Selection

Combination of 1)+2):	1	2
Combination of 1)+2)+3):	2	

2. PV electrified Villages and Localities

Electrification Rate (variable)	See INPUT (2)	40%	20% for BCS ←
Installation period from ending in	1 st year		10 th year

Installation period in one village/locality	3 years
Yearly install.rate	1st year 100%
	1st year 35%
	2nd year 40%
	3rd year 25%

Number of Zones for PV Installation 6

3. PV size and demands

1) Households	Projected Ratio	Ratio drivred from Socio-economic Survey
50 Wp	77.1% (2-light system)	50.0%
100 Wp	15.8% (3-4light system)	22.0%
150 Wp	3.5% (6light + radio)	8.1%
200 Wp	0.9% (3-4light + W&B TV)	0.9%
250 Wp	2.6% (3-4light + color TV)	5.7%
350 Wp	(3-4light + fidge)	13.3%
	1.358 times of 50Wp PV system	2.435

2) Public facilities

Factor	1.00
1650 Wp/Village	33 times of 50Wp PV system
350 Wp/Localities	7 times of 50Wp PV system

Average of One System 350Wp	7 of 50Wp
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4. PV system Instillation Procedure and Project Life for the evaluation

Installation Period	As shown in 1.(equal installation)
Project Life for the evaluation	20 years

5. Investment Amount (Facility Cost)

Discount rate (for BCS)	1.00	
Households (size 50wp)	4,500	pula/system
Public facilities (size 50wp)	4,500	pula/system
Battery Charge Station (500Wp)	97,650	pula/system
User of Battery Charging Station	1,400	pula/system including spare battery
Replacement of used Battery		
Households (size 50wp)	500	pula Every 3 years
Public facilities (size 50wp)	500	pula Every 3 years
500wp+Battery C Station	245	pula Every 3 years
Replacement of controller etc. (SHS)	500	pula Every 10 years

Replacement of controller etc. (BCS)	200 pula	Every 10 years
Land Cost:	Free	
Office Building for maintenance persons	50 Pula/month·person	(rental)

6. Manning Schedule

1) Village operation unit

Contract/Deposit Collecting Agent	1 for each Village/Locality
System monitoring Agent	1 for each Village/Locality
Prepaid card/BCS coupon Sales Agent	1 for each Village/Locality

2) Head office

	No. of Person	No. of HHs	Duration	No. of Person	No. of HHs	Duration
Director	1	for the Implementation Body				
Finance/Account/Commercial Section						
Manager	0	for the Implementatin Body				
Accountant	1	per6000HHs	~5th year	1	per12000HHs	6th year~
Finance Officer	0.5	per20000HHs	~5th year	0.5	per20000HHs	6th year~
Commercial Officer	0.5	per20000HHs	~5th year	0.5	per20000HHs	6th year~
Assistant	0	per10000HHs	~5th year	1	per10000HHs	6th year~
Admi. & Training Manager						
Manager	0	for the Implementatin Body				
Officer	1	per20000HHs	~5th year	1	per20000HHs	6th year~
Assistant	1	per20000HHs	~5th year	1	per20000HHs	6th year~
Development & Planing Section						
Manager	0	for the Implementatin Body until installation program is finished				
Officer	1	for the Implementatin Body until installation program is finished				
Assistant	0	for the Implementatin Body until installation program is finished				
Purchasing Section						
Manager	0	for the Implementatin Body				
Officer	1	per2000HHs	every new insta	1	after install. program is finished	
Assistant	1	per1500HHs	every new insta	1	after install. program is finished	
Operation Section						
Manager	1	for the Implementatin Body				
Officer	1	per12000HHs	~13th year	1	per12000HHs	14th year~
Assistant	1	per12000HHs	~13th year	1	per12000HHs	14th year~
Miscellaneous Labor	1	per6000HHs	~5th year	1	per6000HHs	6th year~

3) District Office

Maintenance Section

Leading technician	1	per each zone	~13th year	1	per each zone	14th year~
Assistant technician	1	per each zone	~13th year	0	per each zone	14th year~

Commercial Section

Officer	1	per600HHs	every new insta	1	after installation program is finished	
Assistant	1	per600HHs	every new insta	0	after installation program is finished	
Miscellaneous Labor	1	per6000HHs	~13th year	1	per6000HHs	14th year~

7. Finance Arrangement (refer to 12. Case Study)

Equity	20.0% of Initial Investment	Cut off	12 years
Subsidy for Investment Cost (variable)	80.0% of Initial Investment	Cut off	12 years
Subsidy for Operation Cost (variable)	0.0% of Monthly tariff	Cut off	12 years
Loan (variable)	0.0% of Initial Investment	Cut off	12 years
Loan Condition	Interest	14.0% per ann.	
	Repayment term	10 years	
	Grace Period	0 years	

8. Income Condition

Tariff collection rate 90%

Tariff

H/Hs (size 50wp)	40 Pula/month
Public space (size 50wp)	60 Pula/month
Public (500wp+Battery Charge St.)	15 Pula/month
Deposit	3 months tariff
Amount	0% Surrender rate
Operation Profit	10%

- This money to be allotted in case the users arrears monthly payment
- This money to be allotted for the loss/damage of the facility due to user's fault
- The balance to be returned to the user on surrender(No interest)

9. Operation Cost

Wage

Discount rate for salaries of BPC	1.00
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① Village operation unit

Contract/Deposit Collecting Agent Monitoring/Service personnel 10: % to the Deposit amount for SHS

Salary to be Commission system 7.5 Pula for 50Wp SHS User
 10.0 Pula for 100Wp SHS User
 12.5 Pula for 150Wp SHS User
 15.0 Pula for 200Wp SHS User
 17.5 Pula for 250Wp SHS User
 20.0 Pula for SHS User of more than 250Wp
 33% of Sales of BCS User

Average commission
8.39 P/User
10.755

Min. Base Salary 300 P/month
 Prepaid card/BCS coupon Sales Agent 5 % to the sales amount

② Head office

Director 10,000 Pula/month
 Manager 7,000 Pula/month
 Officer 4,000 Pula/month
 Assistant 2,000 Pula/month
 Miscellaneous Labor 1,000 Pula/month

③ District office

Maintenance Engineer 5,000 Pula/month
 Officer 4,000 Pula/month
 Assistant 2,000 Pula/month
 Miscellaneous Labor 1,000 Pula/village

Overhead 50% of wage for ② Head office and ③ District office

Maintenance cost

Replacement of batteries to be counted in the investment

Insurance, Taxes as cost 0 pula

Sales Commission

Commission of Deposit Collector

10. Depreciation

	PV system	Replaced batteries	Replaced controller
Depreciation period	20 years	3 years	10 years
Method	Straight Curve	Straight Curve	Straight Curve
Salvage Book Value	0%	0%	0%

11. Taxes

Corporate Tax 0%
 Import Duty 0%

12. External Benefit

0 Pula/kWh
 CO2 reduction 3.80 kgCO2/kWh
 Unit price of CO2 reduction 20 US\$/t-CO2
 Benefit of CO2 reduction 0.46 Pula/kWh
 Saving Kerosene 8.5 litle/House/month
 Unit price of kerosene 2.25 Pura/litle
 Benefit of kerosene saving 19.13 Pura/house/month
 Benefit of kerosene saving 2.28 Pula/kWh
 Saving candle 12 Pura/house/month
 Benefit of candle saving 1.41 Pula/kWh
 Saving radiocassette batteries 12 Pura/house/month
 Benefit of batteries saving 1.41 Pula/kWh

Appendix Table 13.2-1-1 Financial Analysis (Base Case A-1)

Case / Combination	FA	2	Monthly Tariff	Collection rate	90%	Salaries and Wages	P/mon	District Office	P/mon	Total Investment Cost in 20 years	IRRROI	IRRROI
			SHS (50Wp)	SHS (50Wp)	SHS (50Wp)	Head Office	Director	Manager	4,000	Subsidy Rate for Investment Cost until 10 years	Generated Cash	Generated Cash
			SHS (50Wp)	SHS (50Wp)	SHS (50Wp)	Director	Manager	4,000	4,000	Subsidy Rate for Investment Cost until 10 years	Generated Cash	Generated Cash
			SHS (50Wp)	SHS (50Wp)	SHS (50Wp)	Director	Manager	4,000	4,000	Subsidy Rate for Investment Cost until 10 years	Generated Cash	Generated Cash
			SHS (50Wp)	SHS (50Wp)	SHS (50Wp)	Director	Manager	4,000	4,000	Subsidy Rate for Investment Cost until 10 years	Generated Cash	Generated Cash
			SHS (50Wp)	SHS (50Wp)	SHS (50Wp)	Director	Manager	4,000	4,000	Subsidy Rate for Investment Cost until 10 years	Generated Cash	Generated Cash
			SHS (50Wp)	SHS (50Wp)	SHS (50Wp)	Director	Manager	4,000	4,000	Subsidy Rate for Investment Cost until 10 years	Generated Cash	Generated Cash
			SHS (50Wp)	SHS (50Wp)	SHS (50Wp)	Director	Manager	4,000	4,000	Subsidy Rate for Investment Cost until 10 years	Generated Cash	Generated Cash
			SHS (50Wp)	SHS (50Wp)	SHS (50Wp)	Director	Manager	4,000	4,000	Subsidy Rate for Investment Cost until 10 years	Generated Cash	Generated Cash
			SHS (50Wp)	SHS (50Wp)	SHS (50Wp)	Director	Manager	4,000	4,000	Subsidy Rate for Investment Cost until 10 years	Generated Cash	Generated Cash
No. of Target Villages	145											
No. of households in Villages	13,787											
No. of target Localities	170											
No. of households in Localities	13,542											
Target Electrification Rate: SHS	40%											
BCS	20%											
Yearly installation rate												
Subsidy / cut off years	20.0%											
Loan / cut off years	80.0%											
Subsidy for Operation Cost to Tariff	0.0%											
Subsidy for investment for 10 years	101,504											
Total fund rate to investment	141,731											
Cash generation after 20 years	86,497											
Year												
ANNUAL INSTALLATION												
No. of Villages installed												
No. of households installed in Settlements (1)												
No. of households installed in Settlements (2)												
No. of households installed in Settlements (3)												
No. of households installed in Settlements (4)												
No. of households installed in Settlements (5)												
No. of households installed in Settlements (6)												
No. of households installed in Settlements (7)												
No. of households installed in Settlements (8)												
No. of households installed in Settlements (9)												
No. of households installed in Settlements (10)												
Total												
Accumulation												
No. of Vill/Localities for BCS installation												
Accumulation												
BCS Potential Demand												
Accumulation												
PV SYSTEM Case:												
SHS (50Wp): Installed households	1,358											
Accumulate	8,39											
Total SHS kWp installed												
PUBLIC (50Wp)												
Villages: No. of Villages	33											
Accumulate: No. of Localities	7											
Total Public PV kWp installed												
Battery C. Station-HHLLDS												
Accumulate												
Battery C. Station-BCS												
Accumulate												
Average users per BCS												
Average BCS capacity to be installed												
Total BCS kW installed												
Grand Total PV kWp installed												
INVESTMENT												
PV System												
SHS (50Wp)												
PUBLIC (50Wp)												
Battery C. Station (1000Wp)-BCS												
Battery C. Station (1000Wp)-HHLLDS												
Battery Exchange												
SHS (50Wp)												
1st time												
2nd time												
3rd time												
4th time												
5th time												
6th time												

Appendix Table 13.2-1-1 Financial Analysis (Base Case A-1)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Depreciation - 8																					
Depreciation - 9																					
Depreciation - 10																					
Depreciation - 11																					
Depreciation - 12																					
Depreciation - 13																					
Depreciation - 14																					
Depreciation - 15																					
Depreciation - 16																					
Depreciation - 17																					
Depreciation - 18																					
Depreciation - 19																					
Depreciation - 20																					
Controller Replacement																					
Accumulated Controller Exchange																					
Book value	0	0	0	0	0	0	0	0	0	0	1247	2808	4305	5534	6574	7664	8660	9638	10640	11505	0
Accumulated depreciation											62	265	621	1113	1718	2430	3246	4162	5177	6284	6328
Depreciation (Total)											62	265	621	1113	1718	2430	3246	4162	5177	6284	6328
Depreciation - 1											62	125	125	127	123	123	123	123	123	123	123
Depreciation - 2											62	78	136	156	156	156	156	156	156	156	156
Depreciation - 3																					
Depreciation - 4																					
Depreciation - 5																					
Depreciation - 6																					
Depreciation - 7																					
Depreciation - 8																					
Depreciation - 9																					
Depreciation - 10																					
LONG TERM DEBT																					
Long Term Debt																					
Accumulated LTD (A)																					
Principal																					
Interest																					
Debt Service																					
Balance after repayment (A-B)																					
Accumulated Total Repayment (B)																					
Repayment (Total)																					
Repayment - 1																					
Repayment - 2																					
Repayment - 3																					
Repayment - 4																					
Repayment - 5																					
Repayment - 6																					
Repayment - 7																					
Repayment - 8																					
Repayment - 9																					
Repayment - 10																					
Principal for interest (Total)																					
Principal - 1																					
Principal - 2																					
Principal - 3																					
Principal - 4																					
Principal - 5																					
Principal - 6																					
Principal - 7																					
Principal - 8																					
Principal - 9																					
Principal - 10																					
MAINTNG																					
Village Operation Unit																					
Coordinator	30	60	91	122	153	185	217	249	281	315	315	315	315	315	315	315	315	315	315	315	315
Monitoring/Service personnel	30	60	91	122	153	185	217	249	281	315	315	315	315	315	315	315	315	315	315	315	315
Head Office	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
Finance/Account/Commercial Section																					
Manager	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accountant	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Finance Officer	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	10
Commercial Officer	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	10
Assistant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27

Appendix Table 13.2-1-1 Financial Analysis (Base Case A-1)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Administration & Training Manager	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Manager	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assistant	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Assistant	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Development & Planning Section	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manager	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Officer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Assistant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Purchasing Section	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manager	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assistant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operation Section	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Manager	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Officer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Assistant	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Miscellaneous Labor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total No. of Director	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total No. of Manager	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Total No. of Officer	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Total No. of Assistant	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Miscellaneous Labor	12	13	13	12	14	14	14	14	15	15	19	19	17	17	17	17	17	17	17	17	17
Total Head Office																					
District Office																					
Maintenance Section	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Leading technician	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Assistant technician																					
Commercial Section	2	3	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
Officer	2	3	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
Assistant	2	3	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
Miscellaneous Labor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total No. of Technician	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Total No. of Commercial Officer	2	3	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
Total No. of Assistance	2	3	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
Total No. of Miscellaneous Labor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total District Office	17	19	19	19	18	18	18	18	18	18	19	17	17	17	17	17	17	17	17	17	17
TOTAL	29	32	32	31	32	32	32	32	33	33	38	36	34	28	28	28	28	28	28	28	28
INCOME STATEMENTS																					
OPERATION COST	2440	3035	3470	3836	4246	4608	4984	5334	5706	6018	6488	6616	7360	8202	9408	10030	10134	10234	10333	13568	136050
Commissioned Contract/Deposit Collector	14	25	27	21	19	18	18	18	17	16	10	4	0	0	0	0	0	0	0	0	207
Wage of System Monitoring Agent	146	369	580	742	880	1018	1152	1284	1410	1523	1583	1606	1606	1606	1606	1606	1606	1606	1606	1606	25138
Average H/H/s in one Village/Locality	29	40	44	44	42	41	40	39	39	38	40	40	40	40	40	40	40	40	40	40	798
Average No. of PV system 50Wp SHS	39	54	60	59	57	56	55	54	53	51	54	55	55	55	55	55	55	55	55	55	1083
Average No. of PV system 50Wp for Public Fac.	30	29	26	25	23	22	21	20	20	20	19	19	19	19	19	19	19	19	19	19	427
Average salary of System Monitoring Agent(P/m)	405	513	531	507	479	459	442	430	418	403	419	425	425	425	425	425	425	425	425	425	8828
Salaries Commission	32	101	175	241	296	348	399	446	495	539	569	581	584	584	584	584	584	584	584	584	8898
Head Office	1452	1548	1548	1524	1524	1500	1500	1524	1524	1524	1668	1596	1524	1668	1668	1668	1668	1668	1668	1668	28080
Director	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	1680
Officer	288	288	288	288	288	288	288	288	288	288	288	288	288	288	288	288	288	288	288	288	6384
Assistant	72	96	96	72	72	96	96	96	96	120	120	144	144	144	144	144	144	144	144	144	2184
Miscellaneous labor	12	12	12	12	24	24	24	24	24	24	24	36	36	36	36	36	36	36	36	36	552
District Office	876	948	948	888	888	888	888	888	888	888	900	828	828	828	828	828	828	828	828	828	14880
Maintenance Engineer	56	144	144	144	144	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	11880
Commercial Officer	48	72	72	72	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	6384
Assistant	12	12	12	12	24	24	24	24	24	24	24	36	36	36	36	36	36	36	36	36	552
Miscellaneous labor	728	774	774	762	762	750	750	750	762	762	834	798	762	834	834	834	834	834	834	834	14040
Overhead																					
Maintenance Cost (Input by hand)	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	52
Taxes and Insurances (input by hand)	69	216	363	545	762	971	1163	1333	1496	1651	1821	2028	2281	2633	3169	3691	4195	4695	5195	5694	6193
Depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Paid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reimbursement of Security Money	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATING INCOME	952	2472	3983	5266	6360	7437	8443	9430	10423	11310	11786	11972	12002	12002	12002	12002	12002	12002	12002	12002	209947
Tax/Gain	632	2025	3303	4818	5923	6963	7972	8929	9891	10790	11682	11623	11688	11688	11688	11688	11688	11688	11688	11688	177955
SHS (50Wp)	295	861	1345	1764	2140	2502	2832	3121	3443	3744	3872	3872	3872	3872	3872	3872	3872	3872	3872	3872	60765
Public PV (50Wp)	83	213	275	307	324	335	354	369	375	375	375	375	375	375	375	375	375	375	375	375	6758
Battery Charge Station (1000Wp)																					

Appendix Table 13.2-1-1 Financial Analysis (Base Case A-1)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
FINANCINGS																						
Repayment of Principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cash Used for financings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CASH INCREASE OR DECREASE	0	(0)	876	1975	2876	3800	4623	5429	6213	6943	6121	6136	1235	2604	3196	2183	2838	3238	2290	23919	86497	
Beginning Cash Balance	0	0	(0)	876	2852	5728	9528	14151	19580	25792	32736	38856	44993	46228	48832	52028	54211	57049	60287	62578	576304	
Ending Cash Balance	0	(0)	876	2852	5728	9528	14151	19580	25792	32736	38856	44993	46228	48832	52028	54211	57049	60287	62578	64977	86497	
IRROI (without external benefit)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12257	
FIXED CAPITAL EXPENDITURES	4180	3452	2805	2659	2223	2350	2428	2395	2307	2342	1749	1317	0	0	0	0	0	0	0	0	0	30208
Equity	2761	3105	2805	2659	2223	2350	2428	2395	2307	2342	1749	1317	0	0	0	0	0	0	0	0	0	28442
Capital Increase for Previous Deficit	1419	347	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1766
Long Term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash Inflow	0	(0)	876	1975	2876	3800	4623	5429	6213	6943	6121	6136	1235	2604	3196	2183	2838	3238	2290	23919	86497	
Cash Increase or Decrease	0	(0)	876	1975	2876	3800	4623	5429	6213	6943	6121	6136	1235	2604	3196	2183	2838	3238	2290	23919	86497	
Repayment of Principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Interest paid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BEFORE TAX INFLOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
IRROI = 18.05%	(4180)	(3452)	(1928)	(684)	653	1450	2195	3033	3906	4601	4372	4819	1235	2604	3196	2183	2838	3238	2290	23919	56289	18.05%
PAID-UP CAPITAL																						
Equity	4180	3452	2805	2659	2223	2350	2428	2395	2307	2342	1749	1317	0	0	0	0	0	0	0	0	0	30208
Capital Increase for Previous Deficit	2761	3105	2805	2659	2223	2350	2428	2395	2307	2342	1749	1317	0	0	0	0	0	0	0	0	0	28442
Cash Inflow	1419	347	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1766
CASH INFLOW	0	(0)	876	1975	2876	3800	4623	5429	6213	6943	6121	6136	1235	2604	3196	2183	2838	3238	2290	23919	86497	
Cash Increase or Decrease	0	(0)	876	1975	2876	3800	4623	5429	6213	6943	6121	6136	1235	2604	3196	2183	2838	3238	2290	23919	86497	
NET CASH INFLOW	0	(0)	876	1975	2876	3800	4623	5429	6213	6943	6121	6136	1235	2604	3196	2183	2838	3238	2290	23919	56289	18.05%
IRROE = 18.05%	(4180)	(3452)	(1928)	(684)	653	1450	2195	3033	3906	4601	4372	4819	1235	2604	3196	2183	2838	3238	2290	23919	56289	18.05%

Appendix Table 13.2-1-2 Financial Sensitive Analysis Summary

Case No.	Case 11FA	Case 12FA	Case 13FA	Base case FA	Case 20FA (C)	Case 20FA	Case 21FA	Case 22FA	Case 30FA	Case 31FA	Case 32FA	Case 40FA
Villages	145	145	145	145	145	145	145	145	145	145	145	145
No. of Target Villages	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767
No. of Population in Target Villages	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787
No. of H/Hs in Target Villages in 2001	170	170	170	170	170	170	170	170	170	170	170	170
Localities	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666
No. of Target Localities	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542
No. of Population in Target Localities	315	315	315	315	315	315	315	315	315	315	315	315
No. of H/Hs in Target Localities	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433
Total No. of Villages and Localities	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329
Population in Target Villages and Localities	30%	50%	60%	40%	40%	40%	40%	40%	40%	40%	40%	40%
SHS Electrification	9,513	15,856	19,027	12,684	12,684	12,684	12,684	12,684	12,684	12,684	12,684	12,684
Electrification Rate with SHS	646.0	1,076.6	1,291.9	861.3	861.3	861.3	861.3	861.3	861.3	861.3	861.3	861.3
No. of H/Hs electrified with SHS	145	145	145	145	145	145	145	145	145	145	145	145
Public Facilities	170	170	170	170	170	170	170	170	170	170	170	170
No. of Villages for Public Facility PV (1650Wp)	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8
No. of Localities for Public Facility PV (350Wp)	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
BCS Electrification	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314
Electrification Rate with BCS in BCS Targeted	62	62	62	62	62	62	62	62	62	62	62	62
No. of Villages and Localities electrified with BCS	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9
No. of BCS User H/Hs	11,828	18,170	21,341	14,999	14,999	14,999	14,999	14,999	14,999	14,999	14,999	14,999
Total No. of Households electrified with SHS and BCS	37.3%	57.3%	67.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%
Total Electrification Rate	984.6	1,415.2	1,630.6	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9
Total kWp installed	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Equity (for the first 12 years)	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
Subsidy for Investment Cost (for the first 12 years)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Loan (for the first 12 years)	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Interest	12	12	12	12	12	12	12	12	12	12	12	12
Repayment period (years)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subsidy for Operation Cost (to Monthly Tariff)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Monthly Tariff (Pula/Month)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
50Wp (H/Hs)	15	15	15	15	15	15	15	15	15	15	15	15
500Wp BCS	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Collection rate	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
System investment cost (pula)	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
50Wp(H/Hs)	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650
1000Wp BCS	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project
PV demand by PV size	16.2%	19.4%	20.7%	18.0%	7.4%	12.9%	23.1%	28.0%	22.1%	19.9%	16.4%	24.1%
IRROI	16.2%	19.4%	20.7%	18.0%	7.4%	12.9%	23.1%	28.0%	22.1%	19.9%	16.4%	24.1%
IRROE	154,640	216,607	247,590	185,623	185,623	185,623	185,623	185,623	162,688	174,155	197,091	283,913
Total Investment Cost in 20 years	58,136	96,893	116,272	77,514	77,514	77,514	77,514	77,514	62,011	69,763	85,266	138,989
SHS	26,888	26,888	26,888	26,888	26,888	26,888	26,888	26,888	21,510	24,199	29,576	26,888
Public PV	10,277	10,277	10,277	10,277	10,277	10,277	10,277	10,277	8,222	9,249	11,305	10,277
BCS	59,339	82,549	94,154	70,944	70,944	70,944	70,944	70,944	70,944	70,944	70,944	107,759
Battery and controller renewal	0	0	0	0	0	0	0	0	0	0	0	0
Subsidy for operation cost	92,961	130,083	148,644	111,522	111,522	111,522	111,522	111,522	93,174	102,348	120,696	170,404
Subsidy for investment cost for 12 years	60.1%	60.1%	60.0%	60.1%	60.1%	60.1%	60.1%	60.1%	57.3%	58.8%	61.2%	60.0%
Subsidy rate for total investment cost	118,026	84,982	134,549	101,504	101,504	101,504	101,504	101,504	0	92,732	110,277	153,918
Subsidy for investment cost for 10 years	92,961	130,083	148,644	111,522	111,522	111,522	111,522	111,522	93,174	102,348	120,696	170,404
Total subsidy for 12 years	23,721	33,163	37,884	28,442	28,442	28,442	28,442	28,442	23,855	26,149	30,736	43,419
Equity	1,922	1,574	1,383	1,766	2,397	2,082	1,451	1,243	1,766	1,766	1,766	1,191
Capital increase for previous deficit	118,604	164,821	187,911	141,731	142,362	142,046	141,415	141,207	118,795	130,263	153,198	215,013
Total government fund (subsidy, equity and capital increase)	76.7%	76.7%	76.7%	76.7%	76.7%	76.7%	76.7%	76.7%	74.8%	74.8%	74.8%	75.7%
Total government fund rate for investment	51,355	74,825	87,746	62,404	28,759	45,581	79,226	96,155	62,404	62,404	62,404	107,331
Cash generation except saleout of salvaged book value	71,187	103,181	120,363	86,497	52,853	69,675	103,320	120,249	85,112	85,805	87,190	144,944
Cash generation including saleout of salvaged book value												

Appendix Table 13.2-2 Financial Sensitive Analysis Summary

Case No.	Case 11FA	Case 12FA	Case 13FA	Base case FA	Case 20FA (2)	Case 20FA	Case 21FA	Case 22FA	Case 30FA	Case 31FA	Case 32FA	Case 40FA
Villages	145	145	145	145	145	145	145	145	145	145	145	145
No. of Target Villages	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767
No. of Population in Target Villages	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787
No. of H/Hs in Target Villages in 2001	170	170	170	170	170	170	170	170	170	170	170	170
No. of Target Localities	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666
No. of Population in Target Localities	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542
No. of H/Hs in Target Localities	315	315	315	315	315	315	315	315	315	315	315	315
Total No. of Villages and Localities	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433
Population in Target Villages and Localities	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329
Total No. of H/Hs in Target Villages and Localities	30%	50%	60%	40%	40%	40%	40%	40%	40%	40%	40%	40%
SHS Electrification	9,513	15,856	19,027	12,684	12,684	12,684	12,684	12,684	12,684	12,684	12,684	12,684
No. of H/Hs electrified with SHS	646.0	1,076.6	1,291.9	861.3	861.3	861.3	861.3	861.3	861.3	861.3	861.3	861.3
kWp of SHS installed	145	145	145	145	145	145	145	145	145	145	145	145
No. of Villages for Public Facility PV (1650Wp)	170	170	170	170	170	170	170	170	170	170	170	170
No. of Localities for Public Facility PV (350Wp)	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8
kWp of Public PV installed	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Electrification Rate with BCS in BCS Targeted	62	62	62	62	62	62	62	62	62	62	62	62
Electrification Rate with BCS in BCS Targeted with BCS	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314
No. of BCS User H/Hs	62	62	62	62	62	62	62	62	62	62	62	62
No. of BCS installed	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9
kW of BCS installed	11,828	18,170	21,341	14,999	14,999	14,999	14,999	14,999	14,999	14,999	14,999	14,999
Total No. of Households electrified with SHS and BCS	37.3%	57.3%	67.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%
Total Electrification Rate	984.6	1,415.2	1,630.6	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9
Total kWp installed	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Equity (for the first 12 years)	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Subsidy for Investment Cost (for the first 12 years)	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Loan (for the first 12 years)	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Interest	12	12	12	12	12	12	12	12	12	12	12	12
Repayment period (years)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subsidy for Operation Cost (to Monthly Tariff)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Monthly Tariff (Pulz/Month)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
50Wp (Public facilities)	15	15	15	15	15	15	15	15	15	15	15	15
500Wp BCS	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Collection rate	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
50Wp(H/Hs)	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
System investment cost (pula)	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650
50Wp(Public facilities)												
1000Wp BCS												
PV demand by PV size	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project
IRROI	12.5%	14.9%	15.8%	13.9%	4.7%	9.4%	18.2%	22.4%	17.5%	15.5%	12.4%	18.3%
IRROE	12.2%	14.8%	15.9%	13.7%	3.6%	8.7%	18.5%	23.4%	17.8%	15.6%	12.0%	18.8%
Total Investment Cost in 20 years	154,640	216,607	247,590	185,623	185,623	185,623	185,623	185,623	162,688	174,155	197,091	283,913
SHS	58,136	96,893	116,272	77,514	77,514	77,514	77,514	77,514	62,011	69,763	85,266	138,989
Public PV	26,888	26,888	26,888	26,888	26,888	26,888	26,888	26,888	21,510	24,199	29,576	26,888
BCS	10,277	10,277	10,277	10,277	10,277	10,277	10,277	10,277	9,249	11,305	11,305	10,277
Battery and controller renewal	59,339	82,549	94,154	70,944	70,944	70,944	70,944	70,944	70,944	70,944	70,944	107,759
Subsidy for operation cost												
Subsidy for investment cost for 12 years	87,151	121,953	139,354	104,552	104,552	104,552	104,552	104,552	87,350	95,951	113,153	159,754
Subsidy rate for total investment cost	56.4%	56.3%	56.3%	56.3%	56.3%	56.3%	56.3%	56.3%	53.7%	55.1%	57.4%	56.3%
Subsidy for investment cost for 10 years	110,650	79,670	126,140	95,160	95,160	95,160	95,160	95,160	0	86,936	103,384	144,298
Total subsidy for 12 years	87,151	121,953	139,354	104,552	104,552	104,552	104,552	104,552	87,350	95,951	113,153	159,754
Equity	23,721	33,163	37,884	28,442	28,442	28,442	28,442	28,442	23,855	26,149	30,736	43,419
Capital increase for previous deficit	2,162	1,871	1,708	2,035	2,919	2,350	1,719	1,404	1,981	2,008	2,061	1,254
Total government fund (subsidy, equity and capital increase)	113,034	156,987	178,946	135,029	135,913	134,713	134,713	134,713	113,186	121,107	145,950	204,426
Total government fund rate for investment investment	73.1%	72.5%	72.3%	72.7%	73.2%	72.9%	72.4%	72.6%	72.4%	71.3%	74.1%	72.0%
Cash generation except saleout of salvaged book value	41,541	61,138	72,122	50,653	17,261	33,831	67,475	84,297	52,697	51,675	49,631	89,141
Cash generation including saleout of salvaged book value	62,780	91,549	107,119	76,478	43,087	59,656	93,300	110,122	76,790	76,634	76,322	129,514

Appendix Table 13.2-3 Financial Sensitive Analysis Summary

Case No.	Case 11FA	Case 12FA	Case 13FA	Base case FA	Case 20FA (2)	Case 20FA	Case 21FA	Case 22FA	Case 30FA	Case 31FA	Case 32FA	Case 40FA
Villages	145	145	145	145	145	145	145	145	145	145	145	145
No. of Target Villages	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767
No. of Population in Target Villages	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787
No. of H/Hs in Target Villages in 2001	170	170	170	170	170	170	170	170	170	170	170	170
Localities	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666
No. of Population in Target Localities	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542
No. of H/Hs in Target Localities	315	315	315	315	315	315	315	315	315	315	315	315
Total No. of Villages and Localities	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433
Population in Target Villages and Localities	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329
Total No. of H/Hs in Target Villages and Localities	30%	50%	60%	40%	40%	40%	40%	40%	40%	40%	40%	40%
SHS Electrification	9,513	15,856	19,027	12,684	12,684	12,684	12,684	12,684	12,684	12,684	12,684	12,684
Electrification Rate with SHS	646.0	1,076.6	1,291.9	861.3	861.3	861.3	861.3	861.3	861.3	861.3	861.3	861.3
No. of H/Hs electrified with SHS	145	145	145	145	145	145	145	145	145	145	145	145
kWp of SHS installed	170	170	170	170	170	170	170	170	170	170	170	170
Public Facilities	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8
No. of Villages for Public Facility PV (1650Wp)	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
No. of Localities for Public Facility PV (350Wp)	62	62	62	62	62	62	62	62	62	62	62	62
kWp of Public PV installed	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314
BCS Electrification	62	62	62	62	62	62	62	62	62	62	62	62
Electrification Rate with BCS in BCS Targeted	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
No. of Villages and Localities electrified with BCS	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314
No. of BCS User H/Hs	62	62	62	62	62	62	62	62	62	62	62	62
No. of BCS installed	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9
kW of BCS installed	11,828	18,170	21,341	14,999	14,999	14,999	14,999	14,999	14,999	14,999	14,999	14,999
Total No. of Households electrified with SHS and BCS	37.3%	57.3%	67.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%
Total Electrification Rate	984.6	1,415.2	1,630.6	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,883.0
Total kWp installed	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Equity (for the first 12 years)	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
Subsidy for Investment Cost (for the first 12 years)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Loan (for the first 12 years)	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Interest	12	12	12	12	12	12	12	12	12	12	12	12
Repayment period (years)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subsidy for Operation Cost (to Monthly Tariff)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Monthly Tariff (Pula/Month)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
50Wp (Public facilities)	15	15	15	15	15	15	15	15	15	15	15	15
500Wp BCS	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Collection rate	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
System investment cost (pula)	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
50Wp(H/Hs)	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650
1000Wp Public facilities												
1000Wp BCS												
PV demand by PV size	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project
IRR0I	9.8%	11.6%	12.3%	10.8%	2.8%	6.9%	14.6%	18.3%	14.1%	12.3%	9.5%	14.3%
IRR0E	8.6%	10.7%	11.6%	9.7%	0.4%	5.0%	14.4%	19.0%	13.8%	11.6%	8.1%	14.0%
Total Investment Cost in 20 years	154,640	216,607	247,590	185,623	185,623	185,623	185,623	185,623	162,688	174,155	197,091	283,913
SHS	58,136	96,893	116,272	77,514	77,514	77,514	77,514	77,514	62,011	69,763	85,266	138,989
Public PV	26,888	26,888	26,888	26,888	26,888	26,888	26,888	26,888	21,510	24,199	29,576	26,888
BCS	10,277	10,277	10,277	10,277	10,277	10,277	10,277	10,277	8,222	9,249	11,305	10,277
Battery and controller renewal	59,339	82,549	94,154	70,944	70,944	70,944	70,944	70,944	70,944	70,944	70,944	107,759
Subsidy for operation cost	81,341	113,823	130,064	97,582	97,582	97,582	97,582	97,582	81,527	89,554	105,609	149,103
Subsidy for investment cost for 12 years	52.6%	52.5%	52.5%	52.6%	52.6%	52.6%	52.6%	52.6%	50.1%	51.4%	53.6%	52.5%
Subsidy rate for total investment cost	103.273	74,359	117,730	88,816	88,816	88,816	88,816	88,816	0	81,140	96,492	134,678
Subsidy for investment cost for 10 years	81,341	113,823	130,064	97,582	97,582	97,582	97,582	97,582	81,527	89,554	105,609	149,103
Total subsidy for 12 years	23,721	33,163	37,884	28,442	28,442	28,442	28,442	28,442	23,855	26,149	30,736	43,419
Equity	2,589	2,168	2,033	3,657	2,984	1,672	2,196	2,249	2,357	2,357	2,357	2,357
Capital increase for previous deficit	107,651	149,154	169,981	128,327	129,681	128,918	128,011	127,696	107,577	117,952	138,702	194,054
Total government fund (subsidy, equity and capital increase)	69.6%	68.7%	68.7%	69.1%	69.9%	69.5%	69.0%	68.8%	66.1%	67.7%	70.4%	68.4%
Total government fund rate for investment investment	31,913	47,450	56,498	38,902	38,902	38,902	38,902	38,902	42,990	40,946	36,858	71,167
Cash generation except saleout of salvaged book value	54,559	79,917	93,875	66,458	66,458	66,458	66,458	66,458	68,469	67,463	65,453	114,301
Cash generation including saleout of salvaged book value												

Appendix Table 13.2-4 Financial Sensitive Analysis Summary

	Case 11FA	Case 12FA	Case 13FA	Base case PA	Case 20FA (C)	Case 21FA	Case 22FA	Case 30FA	Case 31FA	Case 32FA	Case 40FA
Villages	145	145	145	145	145	145	145	145	145	145	145
No. of Target Villages	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767
No. of Population in Target Villages	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787
No. of H/Hs in Target Villages in 2001	170	170	170	170	170	170	170	170	170	170	170
Localities	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666
No. of Population in Target Localities	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542
No. of H/Hs in Target Localities	315	315	315	315	315	315	315	315	315	315	315
Total No. of Villages and Localities	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433
Population in Target Villages and Localities	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329
SHS Electrification	30%	50%	60%	40%	40%	40%	40%	40%	40%	40%	40%
Electrification Rate with SHS	9,513	15,856	19,027	12,684	12,684	12,684	12,684	12,684	12,684	12,684	12,684
No. of H/Hs electrified with SHS	646.0	1,076.6	1,291.9	861.3	861.3	861.3	861.3	861.3	861.3	861.3	861.3
Public Facilities	145	145	145	145	145	145	145	145	145	145	145
No. of Villages for Public Facility PV (1650Wp)	170	170	170	170	170	170	170	170	170	170	170
No. of Localities for Public Facility PV (350Wp)	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8
kWp of Public PV installed	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
BCS Electrification	62	62	62	62	62	62	62	62	62	62	62
Electrification Rate with BCS in BCS Targeted	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314	2,314
No. of Villages and Localities electrified with BCS	62	62	62	62	62	62	62	62	62	62	62
No. of BCS User H/Hs	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9
No. of BCS installed	11,828	18,170	21,341	14,999	14,999	14,999	14,999	14,999	14,999	14,999	14,999
Total No. of Households electrified with SHS and BCS	37.3%	57.3%	67.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%	47.3%
Total Electrification Rate	984.6	1,415.2	1,630.6	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,199.9	1,883.0
Total kWp installed	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Equity (for the first 12 years)	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
Subsidy for Investment Cost (for the first 12 years)	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Loan (for the first 12 years)	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Interest	12	12	12	12	12	12	12	12	12	12	12
Repayment period (years)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subsidy for Operation Cost (to Monthly Tariff)	40.0	40.0	40.0	32.0	36.0	44.0	48.0	40.0	40.0	40.0	40.0
Monthly Tariff (Pula/Month)	60.0	60.0	60.0	48.0	54.0	66.0	72.0	60.0	60.0	60.0	60.0
50Wp (Public facilities)	15	15	15	15	15	15	15	15	15	15	15
500Wp BCS	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Collection rate	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
System investment cost (pula)	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
50Wp(H/Hs)	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650
1000Wp BCS											
PV demand by PV size	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project
IRR0I	7.6%	9.1%	9.7%	8.4%	1.3%	4.9%	11.8%	15.1%	11.4%	9.7%	7.3%
IRR0E	5.5%	7.1%	7.9%	6.3%	#DIV/0!	2.0%	10.6%	15.0%	8.0%	4.8%	9.8%
Total Investment Cost in 20 years	154,640	216,607	247,590	185,623	185,623	185,623	185,623	185,623	174,155	197,091	283,913
SHS	58,136	96,893	116,272	77,514	77,514	77,514	77,514	77,514	62,011	69,763	138,989
Public PV	26,888	26,888	26,888	26,888	26,888	26,888	26,888	26,888	21,510	24,199	29,576
BCS	10,277	10,277	10,277	10,277	10,277	10,277	10,277	10,277	8,222	9,249	11,305
Battery and controller renewal	59,339	82,549	94,154	70,944	70,944	70,944	70,944	70,944	70,944	70,944	107,759
Subsidy for operation cost											
Subsidy for investment cost for 12 years	75,531	105,693	120,774	90,612	90,612	90,612	90,612	90,612	75,703	83,158	138,453
Subsidy rate for total investment cost	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%	46.5%	47.7%	48.8%
Subsidy for investment cost for 10 years	95,897	69,048	109,321	82,472	82,472	82,472	82,472	82,472	0	75,345	89,600
Total subsidy for 12 years	75,531	105,693	120,774	90,612	90,612	90,612	90,612	90,612	75,703	83,158	138,453
Equity	23,721	33,163	37,884	28,442	28,442	28,442	28,442	28,442	23,855	26,149	43,419
Capital increase for previous deficit	3,168	2,606	2,451	2,869	7,748	3,678	2,256	1,940	2,473	2,671	3,067
Total government fund (subsidy, equity and capital increase)	102,420	141,462	161,109	121,923	126,802	122,732	121,310	120,994	102,032	111,977	183,763
Total government fund rate for investment cost	66.2%	65.3%	65.1%	65.7%	68.3%	66.1%	65.4%	65.2%	62.7%	66.9%	64.7%
Cash generation except saleout of salvaged book value	22,439	33,904	40,967	27,449	1,948	11,121	43,973	60,795	33,346	30,397	24,501
Cash generation including saleout of salvaged book value	46,492	68,426	80,724	56,737	27,340	40,409	73,261	90,083	60,210	58,473	55,000

Appendix Table 13.2-5 Financial Sensitive Analysis Summary

Case No.	Case 11FA	Case 12FA	Case 13FA	Basic case FA	Case 20FA (2)	Case 20FA	Case 21FA	Case 22FA	Case 30FA	Case 31FA	Case 32FA	Case 40FA
Villages	145	145	145	145	145	145	145	145	145	145	145	145
No. of Target Villages	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767	61,767
No. of Population in Target Villages	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787	13,787
No. of H/Hs in Target Villages in 2001	170	170	170	170	170	170	170	170	170	170	170	170
Localities	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666	60,666
No. of Population in Target Localities	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542	13,542
No. of H/Hs in Target Localities	315	315	315	315	315	315	315	315	315	315	315	315
Total No. of Villages and Localities	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433	122,433
Population in Target Villages and Localities	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329	27,329
Total No. of H/Hs in Target Villages and Localities	30%	50%	60%	40%	40%	40%	40%	40%	40%	40%	40%	40%
SHS Electrification	9,513	15,856	19,027	12,684	12,684	12,684	12,684	12,684	12,684	12,684	12,684	12,684
No. of H/Hs electrified with SHS	646.0	1,076.6	1,291.9	861.3	861.3	861.3	861.3	861.3	861.3	861.3	861.3	1,344.3
kWp of SHS installed	145	145	145	145	145	145	145	145	145	145	145	145
No. of Localities for Public Facility PV (1650Wp)	170	170	170	170	170	170	170	170	170	170	170	170
No. of Localities for Public Facility PV (350Wp)	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8	298.8
kWp of Public PV installed	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
BCS Electrification	62	62	62	62	62	62	62	62	62	62	62	62
Electrification Rate with BCS in BCS Targeted Villages	3,471	3,471	3,471	3,471	3,471	3,471	3,471	3,471	3,471	3,471	3,471	3,471
No. of BCS User H/Hs	62	62	62	62	62	62	62	62	62	62	62	62
No. of BCS installed	59.8	59.8	59.8	59.8	59.8	59.8	59.8	59.8	59.8	59.8	59.8	59.8
kW of BCS installed	12,985	19,327	22,498	16,156	16,156	16,156	16,156	16,156	16,156	16,156	16,156	16,156
Total No. of Households electrified with SHS and BCS	40.9%	60.9%	70.9%	50.9%	50.9%	50.9%	50.9%	50.9%	50.9%	50.9%	50.9%	50.9%
Total Electrification Rate	1,044.5	1,435.1	1,650.4	1,219.8	1,219.8	1,219.8	1,219.8	1,219.8	1,219.8	1,219.8	1,219.8	1,902.8
Total kWp installed	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Equity (for the first 12 years)	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
Subsidy for Investment Cost (for the first 12 years)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Loan (for the first 12 years)	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Interest	12	12	12	12	12	12	12	12	12	12	12	12
Repayment period (years)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subsidy for Operation Cost (to Monthly Tariff)	40.0	40.0	40.0	32.0	36.0	44.0	48.0	48.0	40.0	40.0	40.0	40.0
Monthly Tariff (Pula/Month)	60.0	60.0	60.0	60.0	54.0	66.0	72.0	72.0	60.0	60.0	60.0	60.0
50Wp (Public facilities)	15	15	15	12	14	17	18	18	15	15	15	15
500Wp BCS	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Collection rate	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
System investment cost (pula)	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
50Wp(H/Hs)	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650	97,650
50Wp(Public facilities)	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project	Dissem. Project
1000Wp BCS	15.8%	19.0%	20.3%	17.6%	7.1%	12.5%	22.6%	27.4%	21.7%	19.5%	16.0%	23.6%
PV demand by PV size	15.8%	19.0%	20.3%	17.6%	7.1%	12.5%	22.6%	27.4%	21.7%	19.5%	16.0%	23.6%
IRR0I	161,884	223,851	254,834	192,867	192,867	192,867	192,867	192,867	169,222	181,045	204,690	291,156
IRR0E	58,136	96,893	116,272	77,514	77,514	77,514	77,514	77,514	62,011	69,763	85,266	138,989
Total Investment Cost in 20 years	26,888	26,888	26,888	26,888	26,888	26,888	26,888	26,888	21,510	24,199	29,576	26,888
SHS	13,823	13,823	13,823	13,823	13,823	13,823	13,823	13,823	11,058	12,441	15,205	13,823
Public PV	63,037	86,247	97,852	74,642	74,642	74,642	74,642	74,642	74,642	74,642	74,642	111,457
BCS	0	0	0	0	0	0	0	0	0	0	0	0
Battery and controller renewal	97,143	134,265	152,826	115,704	115,704	115,704	115,704	115,704	96,788	106,246	125,162	174,585
Subsidy for operation cost	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	57.2%	58.7%	61.1%	60.0%
Subsidy for investment cost for 12 years	121,997	88,953	138,520	105,475	105,475	105,475	105,475	105,475	0	96,419	114,531	157,889
Subsidy rate for total investment cost	97,143	134,265	152,826	115,704	115,704	115,704	115,704	115,704	96,788	106,246	125,162	174,585
Subsidy for investment cost for 10 years	24,799	34,241	38,962	29,520	29,520	29,520	29,520	29,520	24,791	27,155	31,884	44,496
Total subsidy for 12 years	1,831	1,483	1,357	1,675	2,324	1,999	1,350	1,212	1,675	1,675	1,675	1,165
Equity	123,772	169,988	193,145	146,898	147,547	147,223	146,573	146,436	123,253	135,076	158,721	220,246
Capital increase for previous deficit	76.5%	75.9%	76.2%	76.5%	76.3%	76.0%	76.0%	75.9%	72.8%	74.6%	77.5%	75.6%
Total government fund (subsidy, equity and capital increase)	51,374	74,844	87,831	62,422	28,377	45,400	79,445	96,654	62,422	62,422	62,422	107,415
Total government fund rate for investment	71,931	103,924	121,173	87,241	53,196	70,219	104,264	121,473	85,835	87,944	87,944	145,754
Cash generation except saleout of salvaged book value												
Cash generation including saleout of salvaged book value												