ANNEX

ANNEX A

Chart Summary Table Operation & Management by the Operator over a Concession Period of 20 years

General Pre-Conditions		
System Unit (55 Wp)	300	Units
System Unit Cost	450,000	CFA
Replacement Cost	135.0	Million CFA after 20 years' operation

Fee for Service			
Period (Year)	Up to 5	6 to 10	11 to 20
Tariff (CFA/month)	5,130	5,233	5,233
		2%	2%

Initial Payment	
45,000	CFA/Unit

Replacement cost secured after 20 years

Case Study		Cash Position		Fee for Service (CFA/month)		
Subsidy Rate	ROE	After 20 years		Up to 5	5 to 10	10 to 20
50%	20.8%	1.8	Million CFA	5,130	5,233	5,233

Subsidy Rate	Fee	ROE	Cash Position after 20 years		Fee after 5 years	%	ROE	Cash Position after 20 years	
50%	4,650	10.1%	-53.7	Million CFA	5,441	17%	16.9%	0.9	Million CFA
50%	4,890	15.0%	-29.5	Million CFA	5,379	10%	18.9%	4.2	Million CFA
50%	5,130	20.0%	-5.3	Million CFA	5,233	2%	20.8%	1.8	Million CFA
30%	5,920	20.1%	8.6	Million CFA	5,802	-2%	19.1%	0.4	Million CFA
30%	5,670	15.0%	-16.6	Million CFA	5,954	5%	17.3%	2.9	Million CFA

Tariff setting for 50% subsidy

	Initial Fee	Fee after 5 years
10%	4,650	5,441
15%	4,890	5,379
20%	5,130	5,233

Cash Position after 20 years

	No increase	Increase after 5 years
10%	-53.7	0.9
15%	-29.5	4.2
20%	-5.3	1.8

Subsidy = 50%
ROE = 20%
Cash Position on the positive side after 20 years

Fee for Service			Cash position
	0 to 5	6 to 20	after 20 years
100	5,600	5,655	0.6
300	5,130	5,233	1.8
500	5,000	5,150	4.5

L F	1 Renewal of Equipment	1.1	Replacement cost of PV system components
		1.2	Reasonable life term of the various PV system components
	2 Management Cost of Equipment	2.1	Salary (management fees for manually operated systems)
		2.2	Cost for invoicing and fee collection
		2.3	Profit of the Operator
	3 Maintenance Cost of Equipment	3.1	Salary of the local technician
		3.2	Salary of the external technician
		3.3	Periodic expenses cost
		3.4	Cost of spare parts

C	Replacement Cost	1.1 & 1.2	Price (CFA)	Life	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2020	2021	Total
	PV Module (W_p)		180,000	20																	180,000	180,000
	Charge controller (A)		40,000	10										40,000								80,000
	Battery (Ah)		83,000	4				83,000				83,000				83,000						415,000
	Lamps		52,000	5					52,000					52,000					52,000		52,000	208,000
	Renewal 1.1 + 1.2				0	0	0	83,000	52,000	0	0	83,000	0	92,000	0	83,000	0	0	52,000	0	355,000	883,000
No. of installed system	360	Total	(x1,000 CFA)		0	0	0	24,900	15,600	0	0	24,900	0	27,600	0	24,900	0	0	15,600	0	106,500	264,900
														1	for calculation purpose						1	for calculation purpose
														27,600							106,500	

Monthly Expenses for O & M																						
		Installation Units			Installation Units =	360																
					1 to 3 years	3 to 5 years	5 to 10 years															
This Plan	100	300	500		3.0	2.0	2.0															
Local Technician	1.0	3.0	5.0		3.0	1.5	1.0															
External Technician	1.0	2.0	2.5																			
					0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	18	20
					2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2019	2020	2021
X	3.1	Local Technician	40,000	CFA/month		1,440	1,440	1,440	960	960	960	960	960	960	960	960	960	960	960	960	960	960
Y	3.2	External Technician	80,000	CFA/month		1,920	1,920	1,920	1,440	1,440	960	960	960	960	960	960	960	960	960	960	960	960
Z	2.2	Transportation	25,000	CFA/month		900	900	900	600	600	600	600	600	600	600	600	600	600	600	600	600	600
20%	of (X+Y+Z)	equal to (2.3 + 3.3 + 3.4) Miscellaneous	29,000	CFA/month		852	852	852	600	600	504	504	504	504	504	504	504	504	504	504	504	504
% could be determined at the discretion of the operator.				Total (CFA/month)		426	426	426	300	300	252	252	252	252	252	252	252	252	252	252	252	252
	Initial Investment Cost (1,000 CFA)			1,000 CFA/year		5,112	5,112	5,112	3,600	3,600	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024
	135,000	% of the initial investment cost				3.8%	3.8%	3.8%	2.7%	2.7%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
				Cost/system/month (CFA)		1,420	1,420	1,420	1,000	1,000	840	840	840	840	840	840	840	840	840	840	840	840
Community Empowerment Cost				The cost for 2.1 is planned to be taken care of by ASER																		
0%	of Users' Contribution					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2019	2020	2021
Local Technician	0	1,440	1,440	1,440	960	960	960	960	960	960	960	960	960	960	960	960	960	960
External Technician	0	1,920	1,920	1,920	1,440	1,440	960	960	960	960	960	960	960	960	960	960	960	960
Transportation	0	900	900	900	600	600	600	600	600	600	600	600	600	600	600	600	600	600
Miscellaneous	0	852	852	852	600	600	504	504	504	504	504	504	504	504	504	504	504	504

1 **Financial Model for PV Rural Electrification**

1 English, 0 French

Pre-Conditions

K 1 System Unit Cost (55 Wp) 450 (1,000 FCFA)

F, G 2 O & M Cost for Private Operator See "O & M and Renewal"

K, J 3 Capital Structure

Initial Investment Cost	135,000	0.21	US$ million
User's contribution	10%	13,500	
Operator's equity	20%	27,000	
Loan	20%	27,000	
Interest	7.0%		
Repayment	5,400	x 1,000 CFA/year	
Grace period	5 years		
Repayment period	10 years		

94,500 Amount (≈ Subsidy + Loan)

30% Subsidy 50% 67,500 ROE = over a period of 10 years for the operator's profitability 0 Profit at sales

4 Others ROE = 20.8% over a period of 20 years for the operator's profitability without liquidation

Depreciation method A straight-line method FIRR = 0.9%

N Income tax rate 0%

L 5 **Tariff**

up to 2006	up to 2011	after 2012	
0%	2%	2.0%	Tariff setting after 10 years
5,130	5,233	5,233	← Increase in tariff after 10 years

A, E 45,000 FCFA For the initial payment which may be regarded as 'User's Contribution'

OK 5,130 FCFA/Unit/month For the monthly payment

660,600 (Total amount of user's payment for 10 years)

11,466 Minimum Accu. Cashflow

22,590 Cash Position after 10 year

0 For equity liquidation

31,425 Minimum Acc. Cashflow

1,790 Cash Position after 20 year after reduction of the replacement cost 136.8

6 No. of Subscribers 300 Units

, where the amount required for replacement be secured, say, 135.0 Million CFA

31,425 to secure the cash position on the plus side over a period of 20 years

7 Depreciation (US$ = 650 FCFA)

		FCFA/System	Life	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2021
				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PV Module (Wp)	55	180,000	20	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000
Charge controller (A)	8	40,000	10	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Battery (Ah)	100	83,000	4	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750	20,750
Lamps	4	52,000	5	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400
Pole, Cable, etc.	1	60,000	20	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Installation, Transport	1	35,000	20	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750
Sub-total	1	450,000		48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900
Difference		0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		450,000		48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900	48,900
		Depreciation		14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670

I, L	8	**Projection of Income**																	
			2001	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2021*
		Fee Collection Rate		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Revenue		18,468	18,468	18,468	18,468	18,468	18,837	18,837	18,837	18,837	18,837	18,837	18,837	18,837	18,837	18,837	18,837	18,837
		Expenses Direct cost		5,112	5,112	5,112	3,600	3,600	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024
		Gross Profit	0	13,356	13,356	13,356	14,868	14,868	15,813	15,813	15,813	15,813	15,813	15,813	15,813	15,813	15,813	15,813	15,813	15,813
		Depreciation		14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670
		Interest	0	1,890	1,890	1,890	1,890	1,890	1,890	1,512	1,134	756	378	0	0	0	0	0	0	0
		Net Profit	0	-3,204	-3,204	-3,204	-1,692	-1,692	-747	-369	9	387	765	1,143	1,143	1,143	1,143	1,143	1,143	1,143
		Income tax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Minimum income tax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net Income	0	-3,204	-3,204	-3,204	-1,692	-1,692	-747	-369	9	387	765	1,143	1,143	1,143	1,143	1,143	1,143	1,143
		Accumulated Profit	0	-3,204	-6,408	-9,612	-11,304	-12,996	-13,743	-14,111	-14,102	-13,715	-12,949	-11,806	-10,662	-9,519	-8,376	-7,232	-6,089	-1,516
J		**Debt Financing**	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	20
		Loan at beg		27,000	27,000	27,000	27,000	27,000	27,000	21,600	16,200	10,800	5,400	0	0	0	0	0	0	0
		Repayment							5,400	5,400	5,400	5,400	5,400							
		Interest	0	1,890	1,890	1,890	1,890	1,890	1,890	1,512	1,134	756	378	0	0	0	0	0	0	0
		Loan at end	27,000	27,000	27,000	27,000	27,000	27,000	21,600	16,200	10,800	5,400	0							
H		**Cash-Flow Stream**	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2021
		Net income	0	-3,204	-3,204	-3,204	-1,692	-1,692	-747	-369	9	387	765	1,143	1,143	1,143	1,143	1,143	1,143	1,143
	plus	Depreciation	0	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670
	plus	User's contribution	13,500																	
	plus	Equity	27,000										0							
	plus	Additional equity (Work	0										0			0				
	plus	Loan	27,000																	
	plus	Subsidy	67,500																	
	minus	Repayment	0	0	0	0	0	0	5,400	5,400	5,400	5,400	5,400	0	0	0	0	0	0	0
	minus	Initial Investment	135,000										100%							
	minus	**Replacement**		0	0	0	24,900	15,600	0	0	24,900	0	27,600	0	24,900	0	0	15,600	24,900	0
O		PV Module (Wp)	180,000																	54,000
		Charge controller (A)	40,000										12,000							12,000
		Battery (Ah)	83,000				24,900				24,900				24,900				24,900	24,900
		Lamps	52,000					15,600					15,600					15,600		15,600
		Pole, Cable, etc.	60,000																	18,000
		Installation, Transport	35,000																	10,500
		Profit for Supplier	0																	

450,000

	Net Cashflow	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2021
H		0	11,466	11,466	11,466	-11,922	-2,622	8,523	8,901	-15,621	9,657	-17,565	15,813	-9,087	15,813	15,813	213	-9,087	15,813
	Accu. Cashflow	0	11,466	22,932	34,398	22,476	19,854	28,377	37,279	21,658	31,315	-13,751	29,564	20,478	36,291	52,104	52,318	43,231	106,484
	Deposit bank rate 4.25%		11,466	23,322	35,581	24,869	23,092	32,401	42,404	28,225	38,842	22,598	39,179	31,425	48,307	65,762	68,212	61,444	136,790
	% of the outstanding amount 80%			2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2021
		-27,000	11,466	11,466	11,466	-11,922	-2,622	8,523	8,901	-15,621	9,657	-17,565	15,813	-9,087	15,813	15,813	213	-9,087	15,813
	Equity Portion	-27,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80%	Bank deposit effect for 80% of the outstandings		0	390	793	1,210	846	785	1,102	1,442	960	1,321	768	1,332	1,068	1,642	2,236	2,319	3,978
	at the beg. of the year Real Cash-Flow	-27,000	11,466	11,856	12,259	-10,712	-1,776	9,308	10,003	-14,179	10,617	-16,244	16,582	-7,755	16,882	17,456	2,449	-6,767	19,791
	Operator's ROE = 20.8%		11,466	23,322	35,581	24,869	23,092	32,401	42,404	28,225	38,842	22,598	39,179	31,425	48,307	65,762	68,212	61,444	136,790

	Profitability	5.0%	-27,000										Liquidation of the operator's equity =	0						
		Profit at sale	0										Cash outstandings after the liquidation =	22,598		27,000				
O	Operator ROE =		-27,000	0	0	0	0	0	0	0	0	0	0							
	(for 10 years)																			
	Equity owner		-40,500	11,466	11,856	12,259	-10,712	-1,776	9,308	10,003	-14,179	10,617	-16,244	16,582	-7,755	16,882	17,456	2,449	-6,767	19,791
	(for 20 years)	Accu. Cashflow		11,466	23,322	35,581	24,869	23,092	32,401	42,404	28,225	38,842	22,598	39,179	31,425	48,307	65,762	68,212	61,444	136,790

	Balance Sheets	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2021
H,I	Loan	27,000	27,000	27,000	27,000	27,000	27,000	21,600	16,200	10,800	5,400	0	0	0	0	0	0	0	0
	User's contribution	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500
	Additional equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Equity	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*	*27,000*
	Retained earnings	0	-3,204	-6,018	-8,429	-8,911	-9,758	-9,719	-8,986	-7,535	-6,188	-4,102	-2,191	285	2,497	5,282	8,662	12,124	28,790
	Subsidy	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500
	Liabilities & Equity	135,000	131,796	128,982	126,571	126,089	125,242	119,881	115,214	111,265	107,212	103,898	105,809	108,285	110,497	113,282	116,662	120,124	136,790
	Cash	0	11,466	23,322	35,581	24,869	23,092	32,401	42,404	28,225	38,842	22,598	39,179	31,425	48,307	65,762	68,212	61,444	136,790
	Assets	135,000	120,330	105,660	90,990	101,220	102,150	87,480	72,810	83,040	68,370	81,300	66,630	76,860	62,190	47,520	48,450	58,680	0
	Assets	135,000	131,796	128,982	126,571	126,089	125,242	119,881	115,214	111,265	107,212	103,898	105,809	108,285	110,497	113,282	116,662	120,124	136,790
												0	0	0	0	0	0	0	0

450,000

H

Net Cashflow	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2021
	0	11,466	11,466	11,466	-11,922	-2,622	8,523	8,901	-15,621	9,657	-17,565	15,813	-9,087	15,813	15,813	213	-9,087	15,813
Accu. Cashflow	0	11,466	22,932	34,398	22,476	19,854	28,377	37,279	21,658	31,315	13,751	29,564	20,478	36,291	52,104	52,318	43,231	106,484
Deposit bank rate 4.25%		11,466	23,322	35,581	24,869	23,092	32,401	42,404	28,225	38,842	22,598	39,179	31,425	48,307	65,762	68,212	61,444	136,790

% of the outstanding amount 80%

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2021
-27,000	11,466	11,466	11,466	-11,922	-2,622	8,523	8,901	-15,621	9,657	-17,565	15,813	-9,087	15,813	15,813	213	-9,087	15,813	
Equity Portion -27,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80% Bank deposit effect for 80% of the outstanding r	0	390	793	1,210	846	785	1,102	1,442	960	1,321	768	1,332	1,068	1,642	2,236	2,319	3,978	
at the beg. of the year Real Cash-Flow -27,000	11,466	11,856	12,259	-10,712	-1,776	9,308	10,003	-14,179	10,617	-16,244	16,582	-7,755	16,882	17,456	2,449	-6,767	19,791	
Operator's ROE = 20.8%	11,466	23,322	35,581	24,869	23,092	32,401	42,404	28,225	38,842	22,598	39,179	31,425	48,307	65,762	68,212	61,444	136,790	

O

Profitability 5.0%	-27,000																	
Profit at sale	0											Liquidation of the operator's equity =	0					
												Cash outtakings after the liquidation =	22,598					27,000
Operator ROE =	-27,000	0	0	0	0	0	0	0	0	0	0							
(for 10 years)																		
Equity owner	-48,500	11,466	11,856	12,259	-10,712	-1,776	9,308	10,003	-14,179	10,617	-16,244	16,582	-7,755	16,882	17,456	2,449	-6,767	19,791
(for 20 years) Accu. Cashflow		11,466	23,322	35,581	24,869	23,092	32,401	42,404	28,225	38,842	22,598	39,179	31,425	48,307	65,762	68,212	61,444	136,790

H.1

Balance Sheets	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2021
Loan	27,000	27,000	27,000	27,000	27,000	27,000	21,600	16,200	10,800	5,400	0	0	0	0	0	0	0	0
User's contribution	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500
Additional equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equity	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000
Retained earnings	0	-3,204	-4,018	-5,429	-4,911	-9,758	-9,719	-8,996	-7,535	-4,188	-4,102	-2,191	285	2,497	5,282	5,662	12,234	38,790
Subsidy	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500
Liabilities & Equity	135,000	131,796	128,982	126,571	126,089	125,242	119,881	115,214	111,265	107,212	103,898	105,809	108,285	110,497	113,282	116,662	120,124	136,790
Cash	0	11,466	23,322	35,581	24,869	23,092	32,401	42,404	28,225	38,842	22,598	39,179	31,425	48,307	65,762	68,212	61,444	136,790
Assets	135,000	120,330	105,660	90,990	101,220	102,150	87,480	72,810	83,040	68,370	81,300	66,630	76,860	62,190	47,520	48,450	58,680	0
Assets	135,000	131,796	128,982	126,571	126,089	125,242	119,881	115,214	111,265	107,212	103,898	105,809	108,285	110,497	113,282	116,662	120,124	136,790
											0	0	0	0	0	0	0	0

Cashflow Stream & Cash Position (Case 2)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2021
(in case of no liquidation) Cashflow	11,466	11,856	12,259	-10,712	-1,776	9,308	10,003	-14,179	10,617	-16,244	16,582	-7,755	16,882	17,456	2,449	-6,767	19,791
Accu. Cashflow	11,466	23,322	35,581	24,869	23,092	32,401	42,404	28,225	38,842	22,598	39,179	31,425	48,307	65,762	68,212	61,444	136,790

Annex B

1 Financial Plan for PV Rural Electrification **Case III**

1 English, 0 French

Pre-conditions

No. of total installation units : **70,000**

Subsidy rate : **50%**

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Installation Units	(55 Wp)		1,000	2,000	2,000	2,500	2,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	70,000
Price of PV System in US$		600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	
Exchange rate US$=		750	788	827	868	912	957	1,005	1,055	1,108	1,163	1,222	1,222	1,222	1,222	1,222	1,222	
Price of PV system in CFA		450,000	472,500	496,125	520,931	546,978	574,327	603,043	633,195	664,855	698,098	733,003	733,003	733,003	733,003	733,003	733,003	
Subsidy		50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	
Annual reduction in subsidy %		0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Loan		20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
(Subsidy + Loan)	(%)		70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	
Total Amount of Financial Support from ASER (A)	(Million CFA)		331	695	729	957	1,005	2,533	2,659	2,792	2,932	3,079	3,079	3,079	3,079	3,079	3,079	33,105
Total Amount of Technical Support from ASER (B)	(Million CFA)		66	139	146	191	201	507	532	558	586	616	616	616	616	616	616	6,621
(B)/(A) =	20%																	
Total Amount	(Million CFA)		397	833	875	1,149	1,206	3,039	3,191	3,351	3,518	3,694	3,694	3,694	3,694	3,694	3,694	39,726
Exchange Rate US$ =		750	788	827	868	912	957	1,005	1,055	1,108	1,163	1,222	1,222	1,222	1,222	1,222	1,222	
Devaluation growth of CFA =		5.0%																
Total Amount	(Million US$)		0.50	1.01	1.01	1.26	1.26	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	35.3
Accumulated Amount	(Million US$)		0.5	1.5	2.5	3.8	5.0	8.1	11.1	14.1	17.1	20.2	23.2	26.2	29.2	32.3	35.3	

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Total Amount (Million CFA)		397	833	875	1,149	1,206	3,039	3,191	3,351	3,518	3,694	3,694	3,694	3,694	3,694	3,694	39,726
Total Amount (Thousand US$)		504	1,008	1,008	1,260	1,260	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	3,024	35,280
Installation Units		1,000	2,000	2,000	2,500	2,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	70,000
Accumulated Units		1,000	3,000	5,000	7,500	10,000	16,000	22,000	28,000	34,000	40,000	46,000	52,000	58,000	64,000	70,000	

Major parameters																	
Devaluation growth of CFA =	5.0%	0.0%	3.0%	5.0%	(No change of exchange rate is applied for the years after 2010)			Case Study	5.0%		Devaluation growth of CFA	0%	3%	5%			
									39,726		Total Amount (Million CFA)	26,460	33,795	39,726			
									35,280		Total Amount (Thousand US$)	35,280	35,280	35,280			

ANNEX B SUMMARY OF NATIONWIDE SOCIOECONOMIC SURVEY

1. Objective

The nationwide socioeconomic survey, hereinafter called "the survey" was carried out as a component of the JICA Study. The Survey was intended to provide valuable information with the implementation Plan on PV Rural Electrification. The survey is largely classified into two (2) parts. One is the inquiry about rural electrification towards rural communities of about 320 scattered nationwide. The other is household survey consisting of many questionnaires about socio-economic profiles of the target villages (80). The survey carried out from July to September 2000 was commissioned to a local consultant called SEMIS.

2. Inquiries about Rural Electrification

(1) Samples

The questionnaire survey was conducted towards 320 rural communities all over the country. Five village leaders as representatives of a community rural were selected so that the number of samples (a set of questionnaire sheets) is 1,600. The questionnaire survey was conducted under the name of the Ministry of Energy and Hydraulic. All questionnaire sheets were mailed to representatives of each community and sent back to Ministry by mail.

(2) Survey Items

The main survey items are as follows:

a) socioeconomic profile
b) Priority of electrification in the development plan
c) The number of villages who intend to install SHS

(3) Collection Rate

About 40 or 12% of the whole samples has been collected so far. Such a collection rate is too low to estimate to what extent community rurals desire rural electrification or the significance of rural electrification in community development program.

3. Household Survey

(1) Number of Target Villages by Region

The following two (2) criteria were employed to select target villages (80).

a) scale of village population
   - less than 500 inhabitants
   - between 500 and 2,000 inhabitants
   - more than 2,000 inhabitants
b) Distance from the existing grid (distance of more than 8 km from the grid)

Regional distribution of 80 target villages by population size is summarized as follows:

Region	Scale of Village Population			Total
	P < 500	500 < P < 2,000	2000 < P	
Diourbel	5	5	0	10
Fatick	2	4	2	8
Kaolack	4	5	0	9
Kolda	5	4	0	9
Louga	9	0	0	9
Saint-Louis	4	2	1	7
Tambakounda	6	5	0	11
Thiès	5	3	1	9
Zinguinchor	4	1	3	8
Total	44	29	7	80
(*)	10,248	2,314	140	12,702

*: Number of non-electrified villages

The sample villages are evenly distributed by region but relatively skewed on a village group having population of less than 500. Forty-four (44) villages or 55 percent of samples concentrates on this range. The number of non-electrified villages is currently estimated to be 12,702, so that 80 villages sampled are just 0.6 percent of the whole non-electrifies villages. The same percentage shares are calculated by size of village population, 0.4 % for village population less than 500, 1.3 % for that between 500 and 2,000, and 5% for that of more than 2,000.

Table B.1 Condition of the Access Road

Region	Population Range	Road Condition *				
		1	2	3	4	Total
Diourbel	Total	0	3	7	0	10
	<500		1	4		5
	500-2,000		2	3		5
	>2,000					0
Fatick	Total	0	2	6	0	8
	<500			2		2
	500-2,000		2	2		4
	>2,000			2		2
Kaolack	Total	2	0	6	1	9
	<500	1		3		4
	500-2,000	1		3	1	5
	>2,000					0
Kolda	Total	3	3	3	0	9
	<500	1	1	3		5
	500-2,000	2	2			4
	>2,000					0
Louga	Total	4	5	0	0	9
	<500	4	4			8
	500-2,000					0
	>2,000		1			1
Saintlys	Total	1	1	5	0	7
	<500		1	3		4
	500-2,000	1		1		2
	>2,000			1		1
Tambacounda	Total	1	0	5	5	11
	<500	1		2	3	6
	500-2,000			3	2	5
	>2,000					
Thies	Total	0	6	2	1	9
	<500		3	1	1	5
	500-2,000		3			3
	>2,000			1		1
Ziguinchor	Total	0	7	1	0	8
	<500		3	1		4
	500-2,000		1			1
	>2,000		3			3
Whole country	Total	11	27	35	7	80
	<500	7	13	19	4	43
	500-2,000	4	10	12	3	29
	>2,000	0	4	4	0	8

Remarks *:

1; Pavement road
2; Tracks easily accessed all through the year
3; Tracks difficult accessed during rainy season
4; Inaccessible during rainy season

Table B.2 Distance to the Access Road
(from the villages inaccessible during rainy season)

Unit: km

	Distance to the Road		
Population Range	AVG	MIN	MAX
<500	12.5	3	19
500-2,000	21.7	12	33

Table B.3 Receiving Condition of the Radio & TV Service

Region	Radio		TV		
	Good	Poor	Good	Poor	No Service
Diourbel	6	4	9	1	
Fatick	8		8		
Kaolack	5	4	4	1	
Kolda	9		7		
Louga	8	1	8		
Saintlys	6		6		
Tamba counda	7	4	7	2	2
Thies	8	1	7	1	
Ziguinchor	8		6		1
Total	65	14	62	5	3

Table B.4 Distance to the Nearest SENELEC Network

Region	Population Range	Distance to the Nearest SENELEC Network				
		<5km	6 - 10 km	11-15 km	16 - 20km	>21km
Diourbel	Total	0	2	7	5	1
	<500	0	1	3	2	1
	500-2,000	0	1	4	3	0
	>2,000					
Fatick	Total	0	5	2	0	1
	<500	0	0	1	0	1
	500-2,000	0	4	0	0	0
	>2,000	0	1	1	0	0
Kaolack	Total	2	2	4	0	1
	<500	2	0	2	0	0
	500-2,000	0	2	2	0	1
	>2,000					
Kolda	Total	1	0	3	0	5
	<500	0	0	2	0	3
	500-2,000	1	0	1	0	2
	>2,000					
Louga	Total	4	1	3	1	1
	<500	4	1	3	1	0
	500-2,000					
	>2,000	0	0	0	0	1
Saintlys	Total	2	2	1	0	2
	<500	1	1	0	0	2
	500-2,000	1	1	0	0	0
	>2,000	0	0	1	0	0
Tamba counda	Total	1	1	5	4	4
	<500	0	1	3	3	2
	500-2,000	1	0	2	1	2
	>2,000					
Thies	Total	3	3	3	2	0
	<500	1	2	2	1	0
	500-2,000	1	1	1	1	0
	>2,000	1	0	0	0	0
Ziguinchor	Total	1	4	2	0	1
	<500	0	1	2	0	1
	500-2,000	1	0	0	0	0
	>2,000	0	3	0	0	0
Whole country	Total	14	20	30	12	16
	<500	8	7	18	7	10
	500-2,000	5	9	10	5	5
	>2,000	1	4	2	0	1

Table B.5 Villages Which Have Electrified Public Facilities

Region	Rural Community	Village	Population	Facilities	Type of Electrification
Diourbel	Ndindy	Ndindy	1,925	Sous prefecture, Centre de sante, chez le marabout	SHS & Battery
Fatick	Ndiop	Ndiop	2,425	mosquees, dispensaire, *maternite et une maison*	SHS & Battery
Fatick	Diarrere	Diohine	2,225	forage, eglise, et quelques maisons	SHS, Generator & Battery
Kolda	Kounkane	Diaobe	1,802	mosquees, postes de sante	SHS, Generator & Battery
Saintlys	Ogo	Thiancogne Mody Maka	107	Forage	SHS
Saintlys	Fanaye	Tatqui	337	Forage, Mosquee, Service elevage, Service des eaux et forets, poste de sante	SHS, Generator & Battery
Saintlys	Ogo	Thiancogne Hiraye	997	Forage	SHS, Generator & Battery
Tambacounda	Bamba Ndiayene	Bamba Ndiayene	1,642	Dispensaire	SHS
Tambacounda	Ballou	Aroundou	1,884	Mosquee, Poste de sante	SHS, Generator & Battery
Thies	Mont Rolland	Keur Daouda Ciss	228	Forage	Generator
Ziguinchor	Mangagoulack	Affiniam	2,288	forage barrage anti sel	Generator

Table B.6 No. of Household Having SHS in the Village

No.	Region	CommRurale	Nomvillage	Population	No. of HH
1	Diourbel	Ndindy	Ndindy	1,925	5
2	Diourbel	Tocky Gare	Tocky Gare	893	1
3	Fatick	Diarrere	Diohine	2,225	7
4	Fatick	Ndiop	Ndiop	2,425	1
5	Kaolack	Ida Mouride	Fass Thieckene	692	1
6	Kolda	Kounkane	Diaobe	1,802	12
7	Kolda	Kounkane	Kabendou	1,703	6
8	Louga	Nger Malal	Keur Maniang	2,000	19
9	Louga	Nguer Malal	Boudi Thiekene	106	9
10	Louga	Nguer Malal	Ngadialam I	127	3
11	St Louis	Fanaye	Diagnoum	1,135	6
12	St Louis	Fanaye	Tatqui	337	2
13	St Louis	Ogo	Danthiady	2,896	2
14	St Louis	Ogo	Thiancogne Hiraye	997	2
15	St Louis	Ogo	Thiancogne Mody Maka	107	2
16	Tambacounda	Ballou	Aroundou	1,884	5
17	Tambacounda	Ballou	Debou Khoule	436	5
18	Tambacounda	Ballou	Djimbe	392	7
19	Tambacounda	Bamba Ndiayene	Bamba Ndiayene	1,642	2
20	Tambacounda	Diawara	Manayel	1,510	6
21	Tambacounda	Missirah	Hamdalaye Tessan	1,459	4
22	Thies	Mont Rolland	Nguith Fall	1,000	1
23	Thies	Mont Rolland	Pakhamkouye II	354	2
24	Ziguinchor	Kartiack	Kartiack	2,235	2
25	Ziguinchor	Kartiack	Thiobon	2,180	4
26	Ziguinchor	Mangagoulack	Affiniam	2,288	5
27	Ziguinchor	Mangagoulack	Diatock	1,720	3
Total					124

Table B.7 List of Villages Having Electrical Repair Capacity

Region	Rural Community	Village	Pop.	Facilities in the Village			
				Hardware/Spare Parts Shop	Workshop/repaire workshop	Joinery	Car Electrician
Diourbel	Ndindy	Ndindy	1,925		○		
Diourbel	Tocky Gare	Tocky Gare	893		○		
Diourblel	Ndindy	Ndindy	1,925	○		○	
Fatick	Diarrere	Diohine	2,225		○		○
Kaolack	Ida Mouride	Fass Thieckene	692		○	○	
Kolda	Kounkane	Diaobe	1,802	○	○	○	
Kolda	Kounkane	Kabendou	1,703		○	○	○
Kolda	Kounkane	Niandouba	580		○		
Kolda	Nemataba	Manka Kounda	694		○		○
Louga	Thiamene	Belgarki	298		○		
St louis	Fanaye	Tatqui	337		○	○	
Tamba counda	Ballou	Aroundou	1,884		○		
Tamba counda	Bamba Ndiayene	Bamba Ndiayene	1,642		○	○	
Tamba counda	Missirah	Hamdalaye Tessan	1,459		○		
Ziguinchor	Kartiack	Kartiack	2,235				○
Ziguinchor	Kartiack	Thiobon	2,180				○
Ziguinchor	Manga goulack	Affiniam	2,288				○

Table B.8 Average Distance to the Nearest Shop from the Village

Unit : km

Region	Population Range	Distance from Village to		
		Hardware/ Spare Parts Shop	Workshop/ Repaire workshop	Car Electrician
Diourbel	<500	12.0	13.6	16.8
	500-2,000	8.0	14.3	16.0
	>2,000			
Fatick	<500	21.0	21.0	21.0
	500-2,000	12.0	10.7	10.7
	>2,000	8.5	12.0	12.0
Kaolack	<500	7.3	9.7	9.7
	500-2,000	15.6	17.0	15.6
	>2,000			
Kolda	<500	8.8	8.8	8.8
	500-2,000	14.3		8.0
	>2,000			
Louga	<500	26.6	25.8	30.4
	500-2,000			
	>2,000	29.0	29.0	29.0
Saintlys	<500	22.3	11.3	22.3
	500-2,000	27.0	27.0	27.0
	>2,000	11.0	11.0	11.0
Tamba counda	<500	20.3	20.3	20.3
	500-2,000	22.4	16.5	24.0
	>2,000			
Thies	<500	8.4	8.4	8.4
	500-2,000	9.7	9.7	9.7
	>2,000	18.0	18.0	18.0
Ziguinchor	<500	19.3	14.0	14.0
	500-2,000	13.0	13.0	13.0
	>2,000	16.3	16.3	
Whole country	<500	16.7	15.2	17.6
	500-2,000	14.9	15.1	16.2
	>2,000	15.5	17.0	17.5

Table B.9 Villages Having Video Session

Region	Rural Community	Village	No. of Video Session
Diourbel	Ndindy	Ndindy	Several
Kolda	Kounkane	Diaobe	Several
Kolda	Kounkane	Kabendou	One
Louga	Thiamene	Ndiambor	Several
St louis	Gae	Keur Malal Talab	Several
Tambacounda	Ballou	Aroundou	One
Tambacounda	Missirah	Hamdalaye Tessan	One
Ziguinchor	Mangagoulack	Diatock	Several

Table B.10 List of Villages Having Generator

Region	Rural Community	Village	No. of Generator	Accumulated Power	Usage of the Generator
Fatick	Diarrere	Diohine	1		Individual use
Fatick	Diarrere	Ngardiam	1		Individual use
Kaolack	Ida Mouride	Khourdane	1	2	Individual use
Kolda	Kounkane	Diaobe	9		
Kolda	Kounkane	Kabendou	1		Water Pumping, Shop/Trade activities
Kolda	Nemataba	Nemataba	1	2	Shop/Trade activities, Individual use
Kolda	Nemataba	Sare Mbirou	1		Individual use
Louga	Kambe	Kambe	2		Water Pumping, Mills
Louga	Nger Malal	Keur Maniang	1		Mills
Louga	Nger Malal	Ngadialam I	1	2	Shop/Trade activities, Individual use
Louga	Thiamene	Belgarki	1	1	Mills
St louis	Ogo	Danthiady	3	55	Water Pumping, Shop/Trade activities, Mills
Tamba counda	Ballou	Aroundou	3		Individual use, Mills
Tamba counda	Ballou	Debou Khoule	4		Shop/Trade activities, Individual use
Tamba counda	Ballou	Djimbe	7		Shop/Trade activities, Individual use, Mills
Tamba counda	Missirah	Hamdalaye Tessan	7		Water Pumping, Shop/Trade activities, Individual use, Mills
Ziguinchor	Mangagoulack	Affiniam	2		Water Pumping, Individual use, Mills
Ziguinchor	Mangagoulack	Diatock	1	340	Water Pumping, Mills

Table B.11 Supply Condition of Diesel Oil

Region	Rural Community	Village	Pop.	Price (CFA/liter)	
				Dry Season	Rainy Season
Diourbel	Ndindy	Ndindy	1,925		
Kaolack	Ida Mouride	Fass Thieckene	692	125	200
Kaolack	Ida Mouride	Keur Ngaye	972	200	200
Kaolack	Saly Escale	Keur Madoumbe	1,859	125	250
St louis	Ogo	Danthiady	2,896	350	350
Tambacounda	Ballou	Djimbe	392	320	340
Tambacounda	Bamba Ndiayene	Bamba Ndiayene	1,642	375	375
Tambacounda	Missirah	Hamdalaye Tessan	1,459	445	445
Ziguinchor	Manga goulack	Diatock	1,720	300	300

Remarks : Diesel oil is steady available all though the year in all villages on the list

Table B.12 Supply Condition of Fuel

Region	Rural Community	Village	Pop.	Fuel (CFA/liter)	
				Dry Season	Rainy Season
Diourbel	Ndindy	Ndindy	1,925		
Kaolack	Ida Mouride	Fass Thieckene	692		
Kaolack	Saly Escale	Keur Madoumbe	1,859	375	400
Kolda	Kounkane	Diaobe	1,802	475	475
Tambacounda	Ballou	Djimbe	392	550	550
Tambacounda	Bamba Ndiayene	Bamba Ndiayene	1,642	600	600
Tambacounda	Missirah	Hamdalaye Tessan	1,459	575	575
Ziguinchor	Manga goulack	Affiniam	2,288	455	455
Ziguinchor	Manga goulack	Diatock	1,720	600	600

Remarks : Fuel is steady available all though the year in all villages on the list

Table B.13 Utilization of the Battery

Region	Population Range	No. of Villages		Total No. of Battery	Battery Charge Place			Charge Cost (CFA)
		Total	Having Battery		In the Village	Outside of Village	Distance (km)	
Diourbel	Total	10	4	11		4		
	<500	5						
	500-2,000	5	4	11		4	15	650
	>2,000							
Fatick	Total	8	4	15		4		
	<500	2						
	500-2,000	4	2	4		2	9	1,100
	>2,000	2	2	11		2	20	1,100
Kaolack	Total	9	3	5		3		
	<500	4	1	2		1	4	1,000
	500-2,000	5	2	3		2	21	1,000
	>2,000							
Kolda	Total	9	6	56	1	5		
	<500	5	3	6		3	11	1,000
	500-2,000	4	3	50	1	2	6	1,250
	>2,000							
Louga	Total	9	8	64	2	6		
	<500	8	7	49	2	5	11	870
	500-2,000							
	>2,000	1	1	15		1	29	1,000
Saintlys	Total	7	5	107	2	3		
	<500	4	2	15	1	1	31	1,000
	500-2,000	2	2	83	1	1	7	100
	>2,000	1	1	9		1	11	1,000
Tamba counda	Total	11	8	90	4	4		
	<500	6	3	29	1	2	20	1,567
	500-2,000	5	5	61	3	2	26	900
	>2,000							
Thies	Total	9	7	20	0	7		
	<500	5	4	3		4	16	850
	500-2,000	3	2	7		2	7	850
	>2,000	1	1	10		1	10	1,000
Ziguinchor	Total	8	5	19	0	5		
	<500	4	2	3		2	19	1,350
	500-2,000	1	1	3		1	13	800
	>2,000	3	2	13		2	20	1,000
Whole country	Total	80	50	387	9	41	37	974
	<500	43	22	107	4	18	15	1,058
	500-2,000	29	21	222	5	16	14	853
	>2,000	8	7	58	0	7	18	1,029

Table B.14 Availability and Average Price of Lighting Source in the Village (1/2)

Region	Population Range	No. of Village	Dry Cell				Candle				Paraffin			Butane Gas		
			Available Type		Average Price		Availability		Average Price		Availability		Average Price /L	Availability		Average Price
			R20	R4	R20	R4	No	Yes	Small	Large	No	Yes		No	Yes	
Diourbel	Total	10	4	3	148	75	8	2	25	50	4	6	244	9	1	
	<500	5	1		150	75	5				3	2	243	5		
	500-2,000	5	3	3	146	75	3	2	25	50	1	4	245	4	1	
	>2,000															
Fatick	Total	8	7	7	142	71	5	3	30	57	1	7	229	7	1	1,400
	<500	2	1	1	150	75	2				1	1	225	2		
	500-2,000	4	4	4	136	69	3	1	25	50		4	233	4		
	>2,000	2	2	2	150	75		2	33	60		2	225	1	1	1,400
Kaolack	Total	9	7	7	143	71	0	8	42	65	1	8	221	9	0	
	<500	4	2	2	150	75		3	50	65	1	3	225	4		
	500-2,000	5	5	5	140	70		5	38	65		5	218	5		
	>2,000															
Kolda	Total	9	6	9	150	75	2	7	47	75	4	5	231	7	2	1,125
	<500	5	3	5	150	75	2	3	50	69	4	1	233	5		
	500-2,000	4	3	4	150	75		4	44	81		4	229	2	2	1,125
	>2,000															
Louga	Total	9	8	9	150	82	2	5	46	93	1	8	274	6	3	1,467
	<500	8	8	8	150	84	2	5	45	92	1	7	271	6	2	1,500
	500-2,000															
	>2,000	1		1	150	60			50	100		1	300		1	1,400
Saintlys	Total	7	6	6	150	75	1	5	50	79	2	5	267	5	2	1,350
	<500	4	3	3	150	75	1	2	50	83	2	2	283	4		
	500-2,000	2	2	2	150	75		2	50	75		2	275	1	1	1,200
	>2,000	1	1	1	150	75		1	50	75		1	200		1	1,500

Table B.14 Availability and Average Price of Lighting Source in the Village (2/2)

Region	Population Range	No. of Village	Dry Cell				Candle				Paraffin			Butane Gas		
			Available Type		Average Price		Availability		Average Price		Availability		Average	Availability		Average
			R20	R4	R20	R4	No	Yes	Small	Large	No	Yes	Price /L	No	Yes	Price
Tamba counda	Total	11	9	7	150	83	0	10	71	81	0	11	250	8	3	1,000
	<500	6	4	2	150	88		5	89	81		6	246	5	1	
	500-2,000	5	5	5	150	80		5	50	82		5	255	3	2	1,000
	>2,000															
Thies	Total	9	7	7	150	73	3	5	28	56	4	5	195	3	6	1,108
	<500	5	3	3	150	83	2	2	28	57	3	2	180	1	4	1,163
	500-2,000	3	3	3	150	75	1	2	30	60	1	2	203	2	1	700
	>2,000	1	1	1	150	35		1	25	50		1	225		1	1,300
Ziguinchor	Total	8	8	0	138		0	8	43	63	0	8	246	7	1	1,850
	<500	4	4		138			4	46	54		4	241	4		
	500-2,000	1	1		100			1	25	75		1	250	1		
	>2,000	3	3		150			3	43	70		3	250	2	1	1,850
Whole country	Total	80	62	55	147	76	21	53	47	72	17	63	241	61	19	1,266
	<500	43	29	24	149	80	14	24	55	73	15	28	244	36	7	1,275
	500-2,000	29	26	26	144	74	7	22	40	71	2	27	237	22	7	1,030
	>2,000	8	7	5	150	64	0	7	40	69	0	8	241	3	5	1,490

Table B.15 Avilable Banks and Credit Organizations

Region	Rural Community	Village	Pop.	Bank A/C	Loan		
				Initial Dept	Availability	Max Amount	Max Period (month)
Diourbel	Tocky Gare	Tocky gare	893	5,000	Y	15,000	6
Fatick	Ndiop	Ndiop	2,425	10,000	Y	500,000	
Fatick	Ndiop	Ndothie	516	7,500	N		
Fatick	Ndiop	Thiale	509	6,500	Y	300,000	6
Kaolack	Ida Mouride	Fass Thieckene	692	25,000	Y	200,000	12
St louis	Fanaye	Diagnoum	1,135	6,500	Y	250,000	9
Tamba counda	Ballou	Djimbe	392	5,000	Y	50,000	2
Tamba counda	Bamba	Fass Ndimbelane	890	100,000	Y	########	9
Tamba counda	Bamba	Ndiagnene	240	15,000	Y	100,000	6
Thies	Mont Rolland	Ndiaye Bopp	3,500		Y	500,000	12
Ziguinchor	Mangagoulack	Bode (ebouck)	297		N		

Table B.16 Average Distance to the Nearest Bank or Credit Organization

Unit : km

Region	Population Range	Distance	Region	Population Range	Distance
Diourbel	<500	21.6	Saintlys	<500	16.3
	500-2,000	17.0		500-2,000	7.0
	>2,000			>2,000	11.0
Fatick	<500	17.0	Tamba counda	<500	12.0
	500-2,000	31.0		500-2,000	21.0
	>2,000	25.0		>2,000	
Kaolack	<500	10.7	Thies	<500	10.4
	500-2,000	50.8		500-2,000	9.7
	>2,000			>2,000	
Kolda	<500	39.4	Ziguinchor	<500	14.0
	500-2,000	32.5		500-2,000	13.0
	>2,000			>2,000	9.0
Louga	<500	27.4	Whole country	<500	20.3
	500-2,000			500-2,000	25.7
	>2,000			>2,000	12.6

Table B.17 Prioritized Public Facilities for Electrification

Region	School	Health Post	House of Nurses	Youth Club	Public Place	Street light	Others
Diourbel	5	3	2	2	10	10	10
Fatick	6	4	1	3	8	8	8
Kaolack	4	5	0	0	6	8	8
Kolda	6	3	1	0	6	9	2
Louga	5	0	0	0	7	7	5
Saintlys	6	2	0	0	5	7	2
Tamba coun	7	4	3	1	7	8	7
Thies	4	2	1	0	8	9	6
Ziguinchor	3	7	2	6	1	3	6
Total	46	30	10	12	58	69	54

Table B.18 No. of Electrified Household by Income Bracket

Income Bracket (CFA1,000)	Electrified	Electrified but out of order	Not electrified	Total
<300	1	6	488	495
300-600	2	2	96	100
600-800	7	3	425	435
800-1,000	9	2	155	166
1,000-2,000	7	1	126	134
2,000-3,000	13	3	156	172
>3,000	6		37	43
N.A.	19		107	126
Total	64	17	1590	1671

Table B.19 No. of the Household Which have the Electrical Appliance by Electrified Condition

Electrified Condition	Type of electrical appliance								No. of House-hold
	Refrige-rator	Fan	Radio/ tape	Radio	Stereo-system	Color TV	B/W TV	Others	
Electrified	15	7	57	41	8	33	28	6	64
Electrified/ out of order	1	1	10	10	0	2	4	0	17
Not electrified	16	2	760	807	11	39	82	15	1,567
N.A.	1	0	11	15	0	1	2	0	23
Total	33	10	838	873	19	75	116	21	1,671

Table B.20 No. of the Household Which Have the Electrical Appliance by Income Bracket

Income Bracket (CFA 1,000)	Type of electrical appliance								No. of House-hold
	Refrige-rator	Fan	Radio/ tape	Radio	Stereo-system	Color TV	B/W TV	Others	
<300	3	0	156	246	0	3	8	6	495
300-600	1	0	37	61	0	1	3	2	100
600-800	4	1	222	225	2	6	14	1	435
800-1,000	2	1	107	88	0	8	15	3	166
1,000-2,000	7	2	89	73	3	13	15	4	134
2,000-3,000	4	1	121	102	3	19	26	1	172
>3,000	3	1	33	24	5	3	13	1	43
N.A.	9	4	73	54	6	22	22	3	126
Total	33	10	838	873	19	75	116	21	1,671

Table B.21 No. of Household Which Have the Electrical Appliance by Region

Income Bracket (CFA1,000)	Type of electrical appliance								No. of House-hold
	Refrige-rator	Fan	Radio/ tape	Radio	Stereo-system	Color TV	B/W TV	Others	
Diourbel	1	0	70	135	1	1	4	0	221
Fatick	0	1	38	71	2	2	4	0	180
Kaolack	1	0	69	103	0	2	1	2	201
Kolda	8	4	139	79	6	9	18	0	195
Louga	2	1	142	113	1	18	32	1	175
Saintlys	2	2	107	78	2	12	20	2	146
Tambacounda	17	2	158	117	6	25	27	9	234
Thies	1	0	72	99	0	1	6	2	199
Ziguinchor	1	0	43	78	1	5	4	5	120
Whole Country	33	10	838	873	19	75	116	21	1,671

Table B.22 No. of Electrical Appearance in the Household

Region	Radio			Radio / tepe			Stereo system			B/W TV			Color TV		
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Diourbel	1.6	1	9	3.5	1	4	1.0	1	1	1.0	1	1			
Fatick	1.5	1	6	1.3	1	6				1.0	1	1	1.5	1	2
Kaolack	1.6	1	5	1.4	1	6				4.0	1	10	1.0	1	1
Kolda	1.6	1	11	1.5	1	7	1.0	1	1	1.0	1	2	1.0	1	1
Louga	1.5	1	5	1.8	1	13	1.0	1	1	1.0	1	1	1.1	1	2
Saintlys	1.8	1	10	2.0	1	20	1.7	1	2	1.2	1	6	1.0	1	1
Tambacounda	1.8	1	10	2.7	1	20	1.0	1	1	1.0	1	2	1.1	1	2
Thies	1.6	1	13	1.2	1	4				1.0	1	1			
Ziguinchor	1.4	1	3	1.2	1	3	1.0	1	1	1.0	1	1	1.3	1	2
Whole Country	1.6	1	13	1.8	1	20	1.1	1	2	1.1	1	10	1.1	1	2

Table B.23 Possession of SHS and Usage by Region

Region	No. of SHS	Main Usage			
		Lighting	TV	Radio	N.A.
Diourbel	1		1		
Fatick	3	3			
Kaolack	0				
Kolda	9	4	3	2	
Louga	27	26			1
Saintlys	11	9	1		1
Tambacounda	19	17	1		1
Thies	1	1			
Ziguinchor	1	1			
Whole Country	72	61	6	2	3

Table B.24 Possession and Main Purpose of SHS and Usage by Region

Income Bracket (CFA1,000)	No. of SHS	Main Purpose			
		Lighting	TV	Radio	N.A.
<300	4	3	1		
300-600	3	3			
600-800	8	7		1	
800-1,000	9	7	1		1
1,000-2,000	8	8			
2,000-3,000	17	12	2	1	2
>3,000	5	5			
N.A.	18	16	2		
Total	72	61	6	2	3

Table B.25 Possession of SHS by Income Bracket by Region

Region	Income Bracket (CFA1,000)								
	<300	300-600	600-800	800-1,000	1,000-2,000	2,000-3,000	>3,000	N.A.	Total
Diourbel								1	1
Fatick		2					1		3
Kaolack									0
Kolda			1	1		2	1	4	9
Louga			3	4	7	9	1	3	27
Saintlys	1		2	2		3	1	2	11
Tambacounda	3	1	1	2	1	2	1	8	19
Thies			1						1
Ziguinchor						1			1
Total	4	3	8	9	8	17	5	18	72

Table B.26 Size and Purchased Price of SHS

Capacity (W)	Purchased Price (CFA)		
	AVG	MIN	MAX
25	75,000	75,000	75,000
36	700,000	400,000	1,000,000
50	272,000	20,000	1,150,000
75	527,000	130,000	924,000
100	480,000	160,000	800,000
150	260,000	260,000	260,000
220	8,370,000	8,370,000	8,370,000
Average	506,994	15,000	8,370,000

Table B.27 Purchase Methods of SHS

Region	Cash	Credit	Free by Project	Brought from abroad	Total
Diourbel		1			1
Fatick	2				2
Kaolack					0
Kolda	6			2	8
Louga	15			10	25
Saintlys	6	2		2	10
Tambacounda	15	2	1	1	19
Thies		1			1
Ziguinchor			1		1
Total	44	6	2	15	67

Table B.28 Country Purchased the SHS

Region	France	Italy	Spain	South Africa	Total
Diourbel					
Fatick					
Kaolack					
Kolda	1				1
Louga	13	4	1	1	19
Saintlys	1				1
Tambacounda	5				5
Thies					
Ziguinchor					
Total	20	4	1	1	26

Remarks : Some respondents answered "Purchased by cash" in Q61 also answered this question

Table B.29 Condition of the SHS

Region	Functioned	Not Functioned
Diourbel	1	
Fatick	2	
Kaolack		
Kolda	8	
Louga	23	3
Saintlys	10	
Tambacounda	17	1
Thies	1	
Ziguinchor		1
Total	62	5

Table B.30 Satisfaction at the SHS

Region	Satisfied	Not Satisfied
Diourbel	1	
Fatick	1	1
Kaolack		
Kolda	5	3
Louga	18	8
Saintlys	10	
Tambacounda	16	2
Thies	1	
Ziguinchor		1
Total	52	15

Table B.31 Availability of the Maintenance Service for the SHS

Region	Available	Not Available
Diourbel		1
Fatick		2
Kaolack		
Kolda	2	6
Louga	19	7
Saintlys		10
Tambacounda	13	5
Thies		1
Ziguinchor		1
Total	34	33

Table B.32 Relationship Between condition of SHS and Availability of the Maintenance Service

Condition of SHS	Availability of the Maintenance		
	Available	Not available	Total
Function	33	29	
Not function	1	4	
Total	34	33	

Table B.33 Wish to Make Contract for Maintenance of SHS

Condition of SHS	Wish to make contract for Maintenance		
	Wish	Not with	Total
Function	5		
Not function	51	8	
Total	56	8	

Table B.34 Type of Lamps Used by Region

Region	Paraffin lamp	Torch Light	Candle	Gas	Total Household
Diourbel	203	198	21	6	221
Fatick	179	134	11	5	180
Kaolack	190	196	50	8	201
Kolda	186	184	53	9	195
Louga	152	172	30	2	175
Saintlys	135	143	8	4	146
Tambacounda	225	230	47	6	234
Thies	192	168	24	21	199
Ziguinchor	119	115	57	4	120
Total	1,581	1,540	301	65	1,671

Table B.35 Type of Lamps Used by Annual Income Bracket

Unit : Household

Annual Income Bracket (CFA1,000)	Paraffin Lamp	Torch light	Candle	Gas Lamp
<300	461	425	85	13
300-600	99	92	16	5
600-800	427	416	79	17
800-1,000	159	156	29	5
1,000-2,000	128	129	28	5
2,000-3,000	159	168	31	6
>3,000	40	40	11	6
N.A	108	114	22	8
Total	1,581	1,540	301	65

Table B.36 *Relationship Between No. of Lamps and No. of Rooms*

Unit : Respondents

No. of Room	No. of Lamps														
	1	2	3	4	5	6	7	8	9	10	11-15	16-20	<20	N.A.	Total
1	16	2			1				1					6	26
2	55	76	13	1							2			11	158
3	28	92	109	17	4	1		1						18	270
4	14	52	93	104	16	3	2					1		11	296
5	8	35	58	46	60	7	2	3			2			11	232
6	9	25	22	39	22	53	4	3	1					11	189
7	4	6	11	20	26	5	26	4	2					4	108
8	2	7	12	12	19	9	7	15	3		3			3	92
9		2	4	13	5	2	3	6	6					6	47
10		5	5	7	4	7	6	3	1	7			1	5	51
11-15	1	2	6	11	12	13	7	6	4	11	18	2		5	98
16-20		1	3	2	4	4	2	3	1	1	5	4	1	7	38
>20			2	1	1	2	1			3	5	2	7		24
N.A.	3	13	7	6	2	2	1	1			1	1		5	42
Total	140	318	345	279	176	108	61	45	19	22	36	10	9	103	1,671

Table B.37 Purchased Frequency of the Paraffin

Region	Every day	Every week	Every month	Others	Total
Diourbel	4	128	54		186
Fatick	18	108	52		178
Kaolack	20	63	90	6	179
Kolda	18	52	80	8	158
Louga	2	56	86	7	151
Saintlys	3	37	76	12	128
Tambacounda	21	76	105	13	215
Thies	20	84	69	9	182
Ziguinchor		34	81		115
Total	106	638	693	55	1,492

Table B.38 Payer for the Paraffine

Payer	No. of household in the Compound							
	1	2	3	4	5	6	<7	Total
All of family members	13	4				1	0	18
Other family member	26	5		2	2		1	36
Son & Daughter	13		1			1	0	15
Each Owner of lamp	13	1					0	14
Each woman	11	1	1	1			0	14
Head of the Household	826	214	106	40	28	5	15	1,234
Leader of the compound	124	9	5	6	2	2	2	150
Wives of the Head of Household	51	7	1	2			0	61
Wives of the leader of Compound			1				0	1
Others	4						0	4
Total	1,081	241	115	51	32	9	18	1,547

Table B.39 Monthly Expenditure for Paraffin Lamp

Unit : CFA/Month

No. of lamps in Household	Total Monthly Expenditure			Monthly Expenditure/Lamp		
	AVG	MIN	MAX	AVG	MIN	MAX
1	513	170	3,240	513	170	3,240
2	651	175	2,500	325	88	1,250
3	901	175	5,000	300	58	1,667
4	1,075	200	8,400	269	50	2,100
5	1,379	225	7,200	276	45	1,440
6	1,496	200	6,000	249	33	1,000
7-10	1,860	265	8,750	228	38	972
11-20	2,914	450	6,750	218	35	545
>20	3,225	3,225	3,225	154	154	154
Total	1,121	170	12,500	301	13	3,240

Table B.40 Monthly Expenditure for Paraffin Lamp by Annual Income Bracket

Annual Income Bracket (CFA1,000)	AVG	MIN	MAX
<300	308.4	37.9	3,240.0
300-600	254.1	50.0	960.0
600-800	299.6	45.0	2,100.0
800-1,000	296.6	37.5	1,500.0
1,000-2,000	307.5	55.6	2,250.0
2,000-3,000	324.6	33.3	1,500.0
>3,000	320.7	66.7	900.0
N.A.	286.7	12.5	1,350.0
Total	301.4	12.5	3,240.0

Table B.41 Replacement of wick

Replace	1,071
Not replace	457
N.A.	143

Table B.42 No. of Paraffin Lamps by Using Hour/Day

Unit : Lamps

Size of Family	Less than 4 hrs/day			More Than 4 hrs/day		
	AVG	MIN	MAX	AVG	MIN	MAX
<6	1.9	1	10	1.9	1	9
6-10	2.5	1	25	2.5	1	13
11-15	2.8	1	11	3.2	1	11
16-20	4.9	1	150	3.9	1	16
21-25	4.4	1	12	5.1	1	12
26-30	6.1	1	27	5.9	2	20
31-35	4.8	2	9	8.6	1	27
36-40	6.3	4	9	7.7	2	18
>41	6.9	1	21	13.9	1	60

Table B.43 No. of Torch Lamps in the Household

Size of Family	No. of Torch Lamps		
	AVG	MIN	MAX
<6	1.8	1	11
6-10	2.6	1	40
11-15	3.0	1	13
16-20	4.1	1	22
21-25	5.2	1	20
26-30	7.6	1	36
31-35	8.6	2	20
36-40	6.7	1	15
>41	16.7	1	70

Table B.44 Availability of Purchasing the Dry Cell in the Village

Population Range	Available	Not Available	N.A.	Total
<500	489	167	21	677
500-2,000	618	107	49	774
>2,000	183	11	26	220
Total	1,290	285	96	1,671

Table B.45 Annual Expenditure for Dry Cells for Torch Light

Unit : CFA

Size of Family	Annual Expenditure		
	AVG	MIN	MAX
<6	870	150	9,000
6-10	1,203	150	12,002
11-15	1,329	150	6,000
16-20	1,837	280	13,200
21-25	2,595	200	12,000
26-30	3,473	450	21,600
31-35	4,014	900	12,000
36-40	3,323	300	9,000
>41	7,575	450	52,500

Table B.46 Frequency to Use Candle for lighting Purpose

Size of Family	Frequency to use the candle			
	Everyday	Rarely	Occasionally	Total
<6	11	12	8	31
6-10	24	49	25	98
11-15	13	44	21	78
16-20	10	19	8	37
21-25	3	10	5	18
26-30	7	1	4	12
31-35	3	2	1	6
36-40	3	4	1	8
>41	3	1		4
Total	77	142	73	292

Table B.47 Average No. and Expenditure of Candle per Week

Size of Family	Consumed No. of Candle		Expenditure for Candle (CFA)
	Big Candle	Small Candle	
<6	5.1	3.8	996
6-10	4.2	4.5	946
11-15	4.7	3.8	835
16-20	4.5	5.8	1,625
21-25	6.0	3.3	1,028
26-30	9.3	6.6	1,552
31-35	8.8	7.7	2,815
36-40	6.1	5.0	669
>41	11.8	11.5	1,133
Total	5.1	4.8	1,088

Table B.48 Availability of the Candle in the Village

Population Range	Available	Not Available
<500	85	53
500-2,000	117	33
>2,000	34	6
Total	236	92

Table B.49 No. of Gas Lamps in the Hoousehold

Size of Family	No. of Gas Lamps			
	1	2	3	4
<6	8			
6-10	11	3		
11-15	10	2		1
16-20	7	3	1	
21-25	5	1		
26-30	5			
31-35	1			
36-40	1	1		
>41	2	1		
Total	50	11	1	1

Table B.50 Average Using Time of Gas Lamp per Day

Unit : Hrs

Annual Income Bracket (CFA1,000)	AVG	MIN	MAX	Sample No.
<300	3.6	1	6	12
300-600	3.8	2	5	5
600-800	3.8	1	8	14
800-1,000	7.0	1	15	3
1,000-2,000	6.3	3	12	4
2,000-3,000	2.3	1	3	3
>3,000	4.5	3	7	6
N.A.	5.0	1	11	8
Total	4.3	1	15	55

Table B.51 Using Gas Bottle for Other Purpose

Using other purpose	37
Not Using for other purpose	36

Table B.52 Frequency of the Gas Bottle Replacement

Usage time of Gas Lamp / day	Frequency of the Replacement		
	Weekly	Monthly	Others
1		6	1
2		1	
3	2	8	1
4	5	12	5
5	1	1	2
6		2	1
7		3	
8			1
11			1
12		1	
15		1	
N.A.	1	16	4

Table B.53 Monthly Expenditure for Gas

Range of Using Time	Replacement Frequency of the Gas Bottle								
	Weekly			Monthly			Others		
	AVG	MIN	MAX	AVG	MIN	MAX	AVG	MIN	MAX
<5	2,479	575	3,300	1,415	550	6,875	4,971	1,400	10,400
5-8	3,000	3,000	3,000	2,475	600	4,950	2,200	700	5,100
9-12							1,500	1,500	1,500
>12				1,200	800	1,600			
N.A.	3,600	3,600	3,600	1,729	600	3,750	1,319	625	2,250
Average	2,684	575	3,600	1,623	550	6,875	3,027	625	10,400

Table B.54 Annual Expenditure for Energy Items
(include all samples)

Unit : CFA

Size of Family	Annual Income Bracket (CFA1,000)							
	<300	300-600	600-800	800-1,000	1,000-2,000	2,000-3,000	>3,000	Average
<6	18,475	17,668	30,532	28,954	55,367	45,197	58,200	24,530
6-10	24,910	30,585	32,738	36,653	53,417	72,985	80,125	35,243
11-15	25,803	23,447	37,733	44,505	52,351	47,706	44,413	36,598
16-20	31,302	42,880	35,651	52,185	78,529	59,853	94,613	49,848
21-25	35,971	45,705	52,469	93,834	67,918	70,621	96,966	67,580
26-30	54,348	16,350	72,086	21,360	96,450	73,213	75,000	82,615
31-35	113,760		73,380	128,100	73,100	255,000	39,975	105,531
36-40		10,140	253,200	74,850	114,000	47,550	133,800	128,718
>41	42,480		151,427			122,381	165,900	160,010
Average	24,989	29,066	37,907	49,310	63,702	66,922	85,248	43,484

Table B.55 Annual Expenditure for Energy Items
(extract samples include expenditure for dry cell)

Unit : CFA

Size of Family	Annual Income Bracket (CFA1,000)							
	<300	300-600	600-800	800-1,000	1,000-2,000	2,000-3,000	>3,000	Average
<6	32,037	53,700	34,423	51,920	99,350	81,400	87,600	50,454
6-10	46,101	35,043	49,712	55,878	87,132	138,825	117,650	64,828
11-15	40,401	35,408	61,602	60,030	72,989	66,086	65,700	58,701
16-20	46,052	53,217	43,603	73,292	93,177	64,717	82,200	62,592
21-25	51,690	51,786	67,320	130,590	79,927	69,386	119,340	87,875
26-30	67,500		91,150	23,100	129,525	90,645	113,950	103,488
31-35	113,760		72,300	150,000	73,100	474,000	45,750	128,811
36-40			253,200	74,850			161,700	185,933
>41	72,000		216,780			165,733	192,000	177,943
Average	44,880	41,782	55,882	74,063	87,164	96,300	113,921	72,387

Table B.56 Annual Expenditure for Lighting

Unit : CFA

Size of Family	Annual Income Bracket (CFA1,000)							
	<300	300-600	600-800	800-1,000	1,000-2,000	2,000-3,000	>3,000	Total
<6	17,801	15,796	20,136	16,505	31,215	26,543	10,200	18,737
6-10	22,143	24,404	25,274	25,621	33,544	38,443	80,100	26,454
11-15	27,832	22,963	30,216	30,790	33,720	39,995	51,440	30,394
16-20	29,720	28,528	29,655	44,433	57,544	53,223	62,325	39,509
21-25	30,909	29,556	51,704	64,371	56,144	49,041	79,368	53,821
26-30	54,960	17,700	60,900	25,560	69,480	75,017	150,000	76,420
31-35	70,560	0	88,200	154,650	33,400	234,000	35,400	94,528
36-40	0	4,800	62,400	37,950	50,400	51,000	107,850	81,075
>41	34,080	0	132,180	0	0	162,405	96,900	105,408
Total	23,537	23,513	30,343	36,909	42,642	49,468	76,781	34,130

Table B.57 Annual Expenditure of the Dry Cells for Radio & Radio/Tape

Unit : CFA

Size of Family	Annual Income Bracket (CFA1,000)							
	<300	300-600	600-800	800-1,000	1,000-2,000	2,000-3,000	>3,000	Total
<6	26,200		25,920	37,800	94,800	54,000	36,000	40,148
6-10	28,161	22,582	30,871	38,349	69,808	125,700	45,000	44,321
11-15	22,842	25,200	39,892	38,513	41,400	41,020	25,200	36,147
16-20	30,105	36,000	26,480	45,180	73,200	36,129	37,800	38,475
21-25	28,800	22,500	26,200	93,780	47,400	36,257	60,780	51,251
26-30	29,700		37,800	10,800	53,800	37,440	51,300	48,660
31-35	82,800		32,400	52,200	34,800	372,000	28,800	68,050
36-40			241,200	56,700			91,200	125,400
>41	57,600		118,800			153,900	144,000	128,930
Total	28,094	25,754	34,412	48,399	57,828	68,257	59,107	45,989

Table B.58 Ownership of the Battery by Region

Region	Owned		Not owned		Total
Diourbel	6	3%	215	97%	221
Fatick	7	4%	173	96%	180
Kaolack	4	2%	197	98%	201
Kolda	40	21%	155	79%	195
Louga	29	17%	146	83%	175
Saintlys	31	21%	115	79%	146
Tambacounda	47	20%	187	80%	234
Thies	12	6%	187	94%	199
Ziguinchor	5	4%	115	96%	120
Total	181	11%	1,490	89%	1,671

Table B.59 Ownership of the Battery by Invcome Level

Annual Income Bracket (CFA1,000)	Owned		Not owned		Total
<300	15	3%	480	97%	495
300-600	4	4%	96	96%	100
600-800	25	6%	410	94%	435
800-1,000	22	13%	144	87%	166
1,000-2,000	21	16%	113	84%	134
2,000-3,000	41	24%	131	76%	172
>3,000	17	40%	26	60%	43
N.A.	36	29%	90	71%	126
Total	181	11%	1,490	89%	1,671

Table B.60 Purpose of the Battery

Region	Radio	Radio/ Tape	TV	Lighting	Others
Diourbel	2	2	2		
Fatick		4	2		
Kaolack	3	3			
Kolda	2	14	28	6	2
Louga		7	26	5	1
Saintlys	3	10	27	5	
Tambacounda	2	11	34	6	1
Thies		5	6	1	
Ziguinchor			4	1	
Total	12	56	129	24	4

Table B.61 No. of the Battery by the Capacity by State

No. of Battery

State	Capacity of Battery												
	40	50	60	70	75	80	100	105	110	120	145	150	200
New	4	4	15	32	4	2	47	2	2	5	1	1	1
Second hand	1		4	11	2		3						
Not identified			1	2									
Total	5	4	20	45	6	2	50	2	2	5	1	1	1

Table B.62 Price of Battery by Capacity by Status

Unit : CFA 1,000

State	Capacity of Battery												
	40	50	60	70	75	80	100	105	110	120	145	150	200
New	38.8	23.3	31.2	42.5	40.8	40.0	46.5	85.0	50.0	45.0	80.0	90.0	
Second hand	25.0		23.3	20.1	21.0		29.2						
Not identified			25.0	30.0									

Table B.63 Frequency of the Battery Charge

Frequency	No. of Users
Daily	5
Weekly	44
Monthly	67
Every Two Month	5
Others	45

Table B.64 Place for the Battery Charge

Population Range	Place for the Battery Charge	
	Inside the village	Some where else
<500	11	45
500-2,000	32	57
>2,000	2	10
Total	45	112

Table B.65 Distance to the Battery Charge Station

Unit : No. of users

Population Range	Distance to the Charge Station					
	<5km	6-10 km	11-20 km	21-30 km	31-40 km	>41km
<500	13	10	8	8		4
500-2,000	8	14	26	4	6	1
>2,000			4	4		2
Total	21	24	38	16	6	7

Table B.66 Transportation Cost to the Battery Charge Station

Unit : CFA

Range of the Distance	Transportation Cost		
	AVG	MIN	MAX
<5km	239	100	550
6-10 km	231	100	550
11-20 km	487	100	1,000
21-30 km	710	200	1,600
31-40 km	364	20	1,000
>41km	630	200	1,250

Table B.67 Cost for Battery Charge

Unit : CFA

Region	Charge Cost		
	AVG	MIN	MAX
Diourbel	700	500	1,000
Fatick	850	700	1,000
Kaolack	1,188	750	2,000
Kolda	1,098	1,000	2,000
Louga	945	750	1,000
Saintlys	966	500	1,500
Tambacounda	1,466	200	4,000
Thies	845	600	1,000
Ziguinchor	940	700	1,000
Whole Country	1,118	200	4,000

Table B.68 Monthly Expenditure for Using Battery

Region	Monthly Expenditure		
	AVG	MIN	MAX
Diourbel	1,488	650	2,600
Fatick	1,575	1,200	2,000
Kaolack	3,075	1,000	8,300
Kolda	2,959	1,000	6,800
Louga	1,865	800	4,600
Saintlys	1,992	500	6,500
Tambacounda	3,308	1,000	12,000
Thies	1,740	600	4,600
Ziguinchor	4,400	2,800	4,800
Whole Country	2,623	500	12,000

Table B.69 No. of Autonomous Generatot In Local Areas

Region	Population	No. of Generator
Diourbel	Total	3
	<500	2
	500-2,000	1
	>2,000	
Fatick	Total	6
	<500	1
	500-2,000	2
	>2,000	3
Kaolack	Total	2
	<500	1
	500-2,000	1
	>2,000	
Kolda	Total	6
	<500	2
	500-2,000	4
	>2,000	
Louga	Total	3
	<500	3
	500-2,000	
	>2,000	
Saintlys	Total	
	<500	
	500-2,000	
	>2,000	
Tambacounda	Total	13
	<500	9
	500-2,000	4
	>2,000	
Thies	Total	3
	<500	
	500-2,000	3
	>2,000	
Ziguinchor	Total	
	<500	
	500-2,000	
	>2,000	
Whole country	Total	36
	<500	18
	500-2,000	15
	>2,000	3

Table B.70 Purpose of the Generator

Purpose	No. of Respondents
TV,Video,Radio/Tape	14
Commercial	5
Others	2

Table B.71 Priority of the Electrification

Region	Priority	Not Priority	Total
Diourbel	215	6	221
Fatick	178	2	180
Kaolack	197	4	201
Kolda	187	8	195
Louga	164	11	175
Saintlys	138	8	146
Tamba counda	216	18	234
Thies	190	9	199
Ziguinchor	119	1	120
Whole country	1,604	67	1,671

Table B.72 Priorities of the Public Service

Public Service	Top priority	Second priority	Third priority
Tape Water	774	464	303
Electricity	769	809	65
Telephone	110	320	1,032
N.A.	18	78	271
Total	1,671	1,671	1,671

Table B.73 Priority for Electricity Use

Electric Usage	Priority				
	Top	Second	Third	Forth	Fifth
Lighting	1,580	23	12	4	
Radio	10	666	135	66	72
Radio/Tape	7	389	465	169	62
Stereo system		2	26	34	25
TV	19	295	422	235	25
Refrigerator	24	174	220	181	123
Fan		16	13	51	107

Table B.74 Selection of the SHS System

Unit : Respondents

Specification of the system	Rental fee	Family Size									Total
		<6	6-10	11-15	16-20	21-25	26-30	31-35	36-40	>41	
2 lamps +Radio/Tape	2,000	88	155	82	29	14	2		1		371
3 lamps +Radio/Tape	3,000	46	113	62	15	6	4			1	247
5 lamps +Radio/Tape	5,000	6	49	37	13	5	4	1	1	1	117
3 lamps +Radio/Tape +B/W TV	5,000	17	42	34	7	4	1			1	106
5 lamps +Radio/Tape +B/W TV	7,500	22	113	77	50	22	3	3	1		291
8 lamps +Radio/Tape +Color TV	10,000	9	63	97	83	46	31	13	13	21	376
No system		21	59	37	26	9	5	1		5	163

Table B.75 Selection of the SHS System

Unit : Respondents

Specification of the system	Rental fee	Annual Income Bracket (CFA1,000)							
		<300	300-600	600-800	800-1,000	1,000-2,000	2,000-3,000	> 3,000	N.A.
2 lamps +Radio/Tape	2,000	158	31	89	33	18	18		24
3 lamps +Radio/Tape	3,000	108	19	71	15	13	15		6
5 lamps +Radio/Tape	5,000	41	7	39	11	8	7	1	3
3 lamps +Radio/Tape +B/W TV	5,000	23	9	39	14	7	8		6
5 lamps +Radio/Tape +B/W TV	7,500	71	10	80	35	31	40	12	12
8 lamps +Radio/Tape +Color TV	10,000	40	13	84	49	49	67	26	48
No system		54	11	33	9	8	17	4	27

Table B.76 Selection of Purchased Option

Specification of the system	<300	300-600	600-800	800-1,000	1,000-2,000	2,000-3,000	> 3,000	N.A.
Cash	37	8	17	8	11	14	7	18
Credit	303	55	309	118	103	135	34	65
Fee for Service	110	27	77	30	15	11	2	22
None	45	10	32	10	5	12		21

Table B.77 Wished Repayment Frequency (if credit system is used)

	Monthly	Bi-monthly	Tri-monthly	Semi annualy	Annualy	Total
Total	172	49	94	53	781	1,149

Table B.78 Affordability for the Installment Cos

Unit : CFA

Specification of the system	Installment Cost
2 lamps +Radio/Tape	25,044
3 lamps +Radio/Tape	28,257
5 lamps +Radio/Tape	39,260
3 lamps +Radio/Tape +B/W TV	33,744
5 lamps +Radio/Tape +B/W TV	39,282
8 lamps +Radio/Tape +Color TV	63,517

Table B.79 Affordability of the Initial Investment and Payment Frequency (in case of Fee for Service)

Innitial Payment	Payment Frequency					
	Monthly	Bi-monthly	Tri-monthly	Semi annually	annualy	Total
50,000	51	120	40	93	1	305
75,000	3	3	3	7		16
120,000	3		2			5
N.A.	7	1	2	3		13
Total	64	124	47	103	1	339

Table B.80 Priority for the Electrification of Public Facilities

Public Facilities	Electrification Priority						
	1st	2nd	3rd	4th	5th	6th	7th
Street of the village	508	441	286	97	28	13	2
Market	6	76	36	50	72	81	64
Public Place	36	163	238	140	132	62	12
School	34	174	236	263	95	21	7
Health Post	202	322	235	110	55	7	1
Mosque/Church	866	396	170	67	11	24	
Youth Club	12	21	44	34	35	36	41
Total	1,664	1,593	1,245	761	428	244	127

Table B.81 Priority for the Electrification of Public Facilities by Region

Region	Public Facilities							
	1	2	3	4	5	6	7	Total
Diourbel	89		6	6	51	66	1	219
Fatick	87	1	7		27	58		180
Kaolack	24		7	2	28	138		199
Kolda	32	1		3	16	141		193
Louga	51		1	2	7	114		175
Saintlys	82	2		7	9	46		146
Tambacounda	42	2	3	8	29	150		234
Thies	85		11	3	20	78	1	198
Ziguinchor	16		1	3	15	75	10	120
Whole country	508	6	36	34	202	866	12	1,664

Remarks : Public Facilities
1; Street of the village
2; Market
3; Public Place
4; School
5; Health Post
6; Mosque/Charch
7; Youth Club

Table B.82 Willingness to Contribute the Electricity Fees for Public Facilities

Region	Contribute	Not contribute
Diourbel	210	11
Fatick	176	4
Kaolack	195	6
Kolda	183	12
Louga	174	1
Saintlys	141	5
Tamba counda	232	2
Thies	187	12
Ziguinchor	119	1
Whole country	1,617	54

ANNEX C BRIEFING PAPER OF VALIDATION SEMINAR

Seminar for the validation of the intervention means tools and launching of the activities of ASER

Report by the committee on "Technical minima and Environmental regulations"

President: Libasse NIANG, president of the Senegalese Association for the Development of Rural electrification (ADER)
Managing Director of ENERGECO

Reporter: Louis SECK, DE/MEH
Cheikh WADE, ASER
Demba SY SENELEC

The committee members are listed in the annexe;

In his opening speech, the president of the committee pointed out the importance of the seminar, thanks to which the government of Senegal will be provided with an instrument allowing the achievement of the objectives defined by the new rural electrification policy. In that respect, everyone is called for contribution, and all the actors of the sector have to mobilize as well.

Further to this opening speech, the consultant presented a summary of his study that is based upon three technological options, which optimal combination will allow better electricity coverage of the country. These are the following options:

- LV network supplied from MV station;
- LV network supplied from generator;
- Solar photovoltaic systems.

The consultant gave then the following precisions:

- For each one of these option, cost reduction factor and flexible environmental regulation have been taken into account for rural areas to have easy access to electrification;

- The three selected option are open solutions coming with technical minima, since each operator is free to propose any technological option provided it is in cope with those minima and the principles of ASER as well;
- Using the various rural electrification experience throughout the world and for rural populations to have easier access to electricity, a whole lot of information are provide to ASER, so that the latter could be able to check and assess electrification offers that are submitted.

Further to the presentation by the consultant, the committee decided to proceed a detailed analysis of the document, topic by topic.

As a result, some improvements to be taken into account by the consultant in his final report were made on both the format and the content of the document. Those observations have been recorded in a minutes of meeting and attached to the report.

Further to some fruitful discussions, the committee confirmed the relevance of the approach that consists in the use alleviated technologies for the reduction of rural electrification cost and made the following recommendations:

1) Make sure that the standards should not constrain both the development of local industry and the increase in value of the natural resources. For instance, by using local timber as poles for energy and telecommunication lines, local manufacturing of the accessories for wire attachment to the top of pole (LV and MV fittings, transformers, connecting and network cables, etc);
2) Improve some network parameters such as sizing up of poles and resulting LV and MV maximum ranges, the value of voltage drops admissible for rural networks, the coefficient of security of the poles and conductors and the characteristics of the generators, etc;
3) Make sure that the maker of the generators have a commercial representation in Senegal;
4) Make sure that the supporting measures coming with the introduction of new technologies such as single-phased are implemented and invite SENELEC to take into account these new parameters in the future development plan for its network;

5) Consider about the minima for other rural electrification technological options such as wind power generation, micro-hydraulic system, more powerful solar systems, hybrid systems, etc.

6) Entitle ASER with the right to get the PV system components to be tested by authorized organizations;

7) Take into account the code of environment and involve the Division of Environment in studies and monitoring works;

8) Make sure that ASER strengthen the capacities of the potential rural electrification local operators and provide support to actors engaging in related industries.

The committee validated the technical minima and environmental regulations while integrating the recommendations here above.

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COMMITTEE REPORT

"INSTITUTIONAL ASPECTS"

The Committee in charge of the analysis of the "institutional aspects" held a meeting on March 28 and 29, 2001. The committee was composed as follows:

President: Mr Issa DIAW MAR

Spokesmen: Mr Chérif SEYE
Mr Cheikh SAMBE

The committee dealt with the following aspects:

1. MISSIONS OF ASER AND INSTITUTIONAL RELATIONS

- Within the scope of its specific information mission, ASER have to target the associations of expatriates (as key actors of rural development).
- Within the scope of the implementation of the ambitious rural electrification national development programme, the promotion of local industries that might contribute achieving the economic efficiency of the services options proposed to the populations should be included among the missions of ASER.
- As regards its mission as the executing agency of the national rural electrification program, it has been recommended that ASER, which should remain very simple and flexible institution, should insist in the notion of "faire - faire" (get to do).
- Within the process of the fulfilment of its missions, ASER has to promote the requisite conditions to collaborate with the other actors of rural development and then promote possible synergies.
- As for the relations between ASER and CRSE, the processing of the applications for RE production licenses and/or distribution concessions as well

as the preparation of the schedule of conditions for concessions are under the responsibility of CRSE as stated by the legal procedures. Therefore, is not necessary to provide for an agreement on the transfer of project ownership between the two institutions.

- The issue relating to the autonomy of ASER has been subjected to very important discussions during the meeting of the committee. The members of the committee agreed upon the following items, namely:
  - The management autonomy of ASER is stated by the regulatory documents,
  - ASER will have to get the resources allowing the strengthening of its operating autonomy (for more details refer to Committee n° 1 "Financing Mechanisms"

2. STRATEGICAL OPTIONS: PPER (Projet Prioritaire d'Electrification Rurale) and ERIL (Projets d'électrification rurale d'initiative locale).

- It would be convenient to forecast and define in the most concise manner possible the conditions for the integration or the coexistence of PPER and ERIL projects. For the economic and financial viability of the ongoing operations, the arbitration of CRSE will be necessary;
- As it has been indicated, the area of the concession should not be definite. There should be some possibilities for its adjustment depending on the evolution of the situation in the first concession that have been awarded through tender call and also depending on the ERIL projects already implemented.
- SENELEC should be authorized to retrocede some concessions included in its own concession area.
- Those areas could be integrated in the concession areas or included in ERIL projects, on the basis of conditions to be decided with CRSE and ASER.

3. PROCEDURES

- The procedures were validated by the committee, subject to the following improvements:

- It has been proposed that the Tender open and evaluation committee that comprises the staff of ASER only should include CRSE and Ministry of Energy.
- However, to keep the operational flexibility of ASER, the absence of one or several members of the committee should not constrain the committee meetings.
- It would be convenient to mention, in the Manual of ASER's procedures, the notion of "fruitless Tender Call" on the one hand and on the other hand provided systematically for an emergency tendering in such cases, instead of organizing negotiations as proposed in the existing document.
- Particularly, the committee suggest to open emergency procedure tendering if one single bidder does not submit his offer and proceed direct negotiation if no bidder submit for the emergency procedure.
- Within the process of the preparation of PLE and processing of project documents submitted by the potential operators, it is necessary to involve the concerned local communities, so that the latter could approve both middle and long term Electrification plans designed for their respective areas.

The committee is validating the institutional mechanisms, subject to the integration of the abovementioned recommendations

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Report by the Committee on "Financing Mechanisms and Selection Criterions for Subsidy"

The Committee III in charge of financing mechanisms and selection criterions for subsidies held a meeting on March 28 and 29, 2001 under the guidance of a board composed as follows;

- President: Mister Yoro FALL, Vice-president of CNES (National Confederation of the Senegalese Employers), Managing Director of COSELEC.
- General spokesman: Madam Marième DIOP, CNCAS
- Spokesmen: Mr Alassane SANE, Mor Badiane TINE and Amadou SOW, ASER

The committee made a thorough analysis of the basic documents that have been prepared by the consultant.

The following agenda were discussed:

- Diagnosis of the rural electrification conditions in Senegal
- Financing mechanisms for rural electrification (RE)
- Financing regulations and conventions with banking institutions and decentralized financing organizations (SFD)
- Eligibility criterions and Subsidy levels

1. Diagnosis of Rural electrification conditions

Out of the four agendas that have been discussed, a consensus was reached as for the objective of the study and the general intervention context of ASER in financial terms. However, the following remarks were made:

a) To recommend an insurance system to guarantee both equipment and fee collection

b) To emphasize the specificity of the two actors that users and operators are. It has equally been stated that these two actors are the most important parameters for the success of a project. It has been recommended to take into account past experiences and field operation conditions that have been experienced by mutual credit and saving funds which collaboration will be highly appreciated.

c) Regarding the selection of the banks and Decentralized Financing Organizations (DFO), the major recommendation is to propose some selection criterions based upon the schedule of conditions that defines the financial incentives that could be discussed with the financing sector so that to create synergies and complementarities.

2. Financing mechanisms for Rural electrification

Regarding the proposals relating to the financing mechanisms for rural electrification, a consensus was reached. However, the following recommendations were made:

a) Set up a financing system so that to make sustainable the operation of ASER;

In that respect, the following items could be discussed:

- Establishment of a tax for rural electrification, to the benefit of ASER, same as the surtax for rural hydraulics that is levied by SDE (private water company) on the water bill of users;
- Allocation to ASER, on the title of rural electrification of the funds of national budget for the triennial priority investments programme (PTIP);
- Transfer to ASER of the audiovisual tax presently allocated to the national TV Company and currently levied on the fuel purchased by SENELEC.

b) Catch up the opportunity offered by World Fund for Environment (FEM) under IDA, the programme for the elimination of poverty and the National Programme for Rural Facilities, etc.

c) Organize round tables with donors so that they can fix the scope of their intervention and allow ASER to prepare the budget schedule for its investments, depending on the availability of funds

d) Fix a subsidy level ensuring well-balanced and harmonized prices to be applied to users.

3. Financial regulations and conventions with banking institutions and DFO

The following recommendations were made:

a) Deepen the theories considered in the basic document, with the financing combination: banks, DFO, BCEAO, Ministry of Economy and Finance;

b) See that the depreciation period of the equipment and the loan period and concession period should be compatible;

c) Recommend an insurance system to guarantee risks (robbery, diminution of income and credit repayment, etc);

d) Promote rural electrification among bankers and donors;

Eligibility criterions and subsidy levels

The discussion of the committee was based on a French summary of the English document.The information contained by that summary do not provide enough indications relating the eligibility criterions of the areas to be electrified or the priority to be given to economic and/or social aspects that are key factors in the allocation of subsidy levels.

The committee recommended more detailed information, namely complete translation of the document made by the consultant and the preparation of the orders of ASER, so that the latter could publish appropriate schedule of conditions for the definition of objective and transparent criterions to govern the allocation procedure of subsidies.

Conclusion

The Committee has validated the financing mechanism while integrating the abovementioned recommendations.[1]

[1] Papa Malick GUEYE