

Appendix Figure 7.1-4 Comparison of Life Cycle Cost of SHS Versus PV Mini-grid (Break-even Consumption Level)

7.1.5 Cost Comparison of SHS with Diesel Mini-grid Electrification

The life-cycle costs for the PV and diesel systems on a per customer basis are compared in Appendix Table 7.1-2, based on the data in the Pacific islands. The present values of the costs in constant dollars for 15 years, discounted at 10 percent per year, are compared for both cases.

The results show that in the household lights only case (55Wp - 1 set) and in the household lights and TV/VCR case (47Wp - 4 set), the PV system shows cost competitiveness on the life-cycle costs basis.

Another important consideration is the fact that proper maintenance for the diesel system is difficult. In fact, it is almost impossible to ensure stable operation of the diesel systems in a small remote village in Botswana.

Appendix Table 7.1-2 Life-cycle Costs in Dollars per Customer of The PV and Diesel Systems

Case	The PV	Diesel
Household Lights Only ^a (55Wp - 1 set)		
Customer: initial appliance costs	132	51
Customer: future appliance costs	133	21
Generation equipment: initial costs ^b	741	750
Generation equipment: future costs ^c	243	189
O&M costs ^d	137	593
Total	1,386	1,604
Household Lights & TV/VCR ^b (47Wp - 4 set)		
Customer: initial appliance costs	732	551
Customer: future appliance costs	476	307
Generation equipment: initial costs ^b	2,216	1,719
Generation equipment: future costs ^c	454	432
O&M costs ^d	137	1,255
Total	4,015	4,264

(Source: World Bank Technical Paper Number 244 Lessons from the Pacific Island Experience, A. Liebenthal et al.)

Note: The present value of costs in constant dollars for 15 years discounted at 10 percent

- a The diesel system will be operated for six hours a day.
- b For the PV system: costs of PV panels, batteries, etc; For the diesel system: costs of power generation, distribution and reticulation equipment.
- c For the PV system: replacement costs of batteries and controllers; For the diesel system: equipment is assumed to last 15 years, with a major overhaul every five years.
- d For the PV system: cost of maintenance provided by solar ESCO; For the diesel system: variable generation (energy) costs.

Appendix Table 7.1-2-1 Comparison of Grid Electrification and SHS

Variables					1	1	1	\dagger	+	+			_		_		1	1				_	A INT TO HITTE
					_	_	_	_	_								_		Γ		H		г
Ш	Units	Unit cost	Units	-	2	ю	4	2	7	∞	6	10	1	12	13	14	15	16	17	18	19 2	20 residua value	at 0 year
									H								H						
																					_		
Capacity 100	Wp																						
Annual consumption 0.365		7300	kWph/y		7,300	7,300 7	7,300 7,	7,300 7,3	7,300 7,300	00 7,300	0 2,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300 7	7,300 7,3	7,300	45,247
Distance from Grid 20	km																						(i = 0.15)
Investment costs (A)		6.3	P/Wp	481,500																			418,696
Battery replace		200	Ь			Š	50,000		50,000	99		50,000			50,000			50,000		2(50,000	(16,667)	(7) 182,959
Operation & maintenance: village		200	P/Village/m		9,000	9 000'9	⊢	9,000,9	000'9 000'9	000'9	000'9	-	9,000	6,000	000'9	9,000	000,9	000'9	000'9	9 000'9	9 000'9	9000	37,189
Agent fee		0.05	%		-	-	⊢	⊢	⊢	-	┢	⊢	2,400	2,400	2,400	┿	┢	├-	2,400	-	2,400 2,4	2,400	14,876
:Head office 276		276	P/H/v		+	+	+-	┿	⊢	-	_		_	₽-	+-	١.	-	13,800 1	13,800	13,800 13	13,800 13,	13,800	85,536
						_	┿	+	-	-	-	_	-	+-	-	+	-	-	-	+	+		730 25
			DA.W.			+	+		+	+					T		\dagger	1	\dagger		1	+	-
			r/kwn		1	+	+	+	+	+	+	\int			1	\dagger	\dagger	1	\dagger	\dagger			+
						+	+	1	-	+							+	1	1	+		1	1
Households 50						+	\dashv		-	\dashv							1		1	\dashv	\dashv		+
Annual consumption		7300	kWph/y		7,300	7,300	7,300 7,	7,300 7,3	7,300 7,300	00 7,300	0 7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300 7	7,300 7,3	7,300	45,247
Distance from Grid 20							-	-															(i = 0.15)
		102816		2.056.320				_		_												(411,264)	64) 1,477,130
Connection costs		4500		225,000	I			H		-	_								ŀ			(45.000)	161.626
2000		200		200,000		t	+	+	+	-	_							-	-				
Operation & maintenance 0.02					41.126	41.126 4	41.126 41	41.126 41.	41.126 41.126	26 41.126	41.126	41.126	41.126	41.126	41.126	41.126	41.126	41.126 4	41.126 4	41.126 4.	41,126 41,	41,126	254,911
		0.075	P/kWh		-	-	+	-	-	-	-	+-	+	-	+	-	+-	+	-	+	-	548	
						╀	╀	╁	╀	╀	+									╀	╀	<u>i </u>	1,897,060
			P.A.W.h			+	\dagger	$\frac{1}{1}$	+	+							1			-			_
																	-						L
Households 100						-				-								H		-			
Ш.						\dagger	\dagger	$\frac{1}{1}$	+	+	_							l					
Ľ		14600	bWoh/v		14 600	14 600	14 600 14	14 600 14	14 600	14 600	14.600	14 600	14 600	14 600	14 600	14 600	14 600	14 600 1	14 600	14 600 14	14 600 14	14 600	
	ķ	000	w. bm)		_	-	-	-	-	-	-	-	-		-	-	-	+	_	+	-		(i = 0.15)
		96.3	P/Wn	963 000		_	\mid	L		-													837,391
Battery replace		2009	Ь			122	100,000		100,000	000	_	100,000			100,000		Ī	100,000		10	100,000	(33,333)	L
Operation & maintenance: village		200	P/Village/m		9000	9 000'9	┺-	9'000'9	000'9 000'9	000'9	000'9	-	9,000	9000	9,000	9000	000'9		000'9	9 000'9	9 000'9	000'9	37,189
Agent fee		0.05	%		┿	+	╫	╀	+	+-	⊢	⊢	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800 4,8	4,800	29,752
:Head office		276	P/H/y		27,600	27,600 2	<u> </u>	27,600 27,	27,600 27,600	27,600	00 27,600	27,600	27,600	27,600	27,600	27,600	27,600	27,600 2	27,600 2	27,600 2	27,600 27,	27,600	171,071
								_	_														1,441,320
			P/kWh				\vdash	-		_] 						
																		-					
Households 100																			_		\rightarrow	_	
Annual consumption		14600	kWph/y		14,600	14,600 1	14,600 14	14,600 14,	14,600 14,600	500 14,600	00 14,600	14,600	14,600	14,600	14,600	14,600	14,600	14,600	14,600	14,600	14,600 14,	14,600	90,494
Distance from Grid 20								-	-		_					1	1				1		(i = 0.15)
Investment costs (A)		102816		2,056,320																		(411,264)	
Connection costs		4500		450,000																		(90,000)	323,251
						_	-																
Operation & maintenance 0.02					_	41,126 4	41,126 41	41,126 41,	41,126 41,126	126 41,126	41,126	41,126	41,126	41,126	41,126	41,126	41,126	41,126 4	41,126	41,126 4	41,126 41,	41,126	254,911
Power generation or import cost		0.075	P/kWh		1,095	1,095	1,095	1,095	1,095 1,095	95 1,095	5 1,095	1,095	1,095	1,095	1,095	1,095	1,095	1,095	1,095	1,095	1,095 1,0	1,095	
						-	1	+	1	-	_								1		1	_	2,062,079
			P/kWh			\exists	\dashv	\exists	-	\parallel						1	1		-	1	$\frac{1}{2}$	-	4

Appendix Table 7.1-2-2 Comparison of Grid Electrification and SHS

	_						-	+	$\frac{1}{1}$	1	1	1	1			1	+	+	\dagger	+		+	+	-	SUE OF NEV
		\vdash	\vdash					_		_					_	_		-		_					
	Vari	Variables Ur	Units Un	Unit cost	Units	-	7	ъ	4 د	9	7	∞	6	10	Ξ	12	13	4	15	16	17 1	18 19	20	residual	at 0 year
1-a SHS Electrification				_																					
	Houscholds(H) 20	200	L							-															
	Capacity 100	\vdash	Wp		-				_			_													
Annual consumption		⊢	<u> </u>	29200	kWph/y	25	29,200 29	29,200 29	29,200 29,200	29,200	0 29,200	0 29,200	29,200	29,200	29,200	29,200	29,200	29,200 2	29,200 29	29,200 29	29,200 29,	29,200 29,200	29,200	0	180,988
Distance from Grid	<u>. </u>	⊢	ķ	┢					-	1	_	_		_	-	+	_			H					(i = 0.15)
Investment costs (A)	L	H	L	96.3	P/Wp 1	1,926,000																			1,674,783
Batter	Battery replace	-	Ė	-				300	200,000		200,000	2		200,000			200,000		36	200,000		200,000	000	(66,667)	731,834
Operation & maintenance: village	e: village	-	Ĺ		P/Village/m	9	9 000'9	9 000'9	000'9	000'9	+	0009	900.9	9000	9.000	900.9	9.000	000.9	9 000.9	6,000	000'9	9 000'9	000'9		37,189
	Agent fee		Ľ	Т	%	6	┰	-	┺	╁	┰	╄	┿	9,600	009'6	009'6	₩	┰	+	⊢	+	+	+		59,503
H	:Head office 276	و	H	276	P/H/v	155	+-	-	╄	╄	_	_	_	-	+	+-	+-	+-	+	-	-	╌	_	0	342,142
Total		+	+	+			_		-	+-	_	_	-	-	-	-	-	-	+	-	-	-	-		2 845 451
1 Otal	-	+	+		DAME	+	+	+	+	+	1	+					\dagger			+	1	1	+	ļ	15.7
1 h Grid Blackrifteeting	+	+	+	+	r/kwii		+	+	-	+		1			Ť	Ì	\dagger	\dagger	+	+	+	-	-	-	
			+	+	\dagger	+	+	+	+	+	-	1			T	T	\dagger	\dagger	+	+	+		+		
Ĭ.	Households 200	3	<u> </u>	+	100	18	_	_	-	-	-	_	_	_	-	-	-	-	-	92.92	900	000.00	200		180 088
Annual consumption		+	1	00767	Kwpn/y	2	27,007,62	67 007'67	29,200 29,200	29,200	29,200	007,67	79,200	29,200	79,200	29,200	007,67	7 007,67	77,200	-	-	-	-		100,5
Distance from Grid	1	20	1				\dashv	\dashv	1	-	4	_						+	+	+	+				4
Investment costs (A)	costs (A)	1	٦	102816	.,	2,056,320		-	-	_								1		-				(411,264)	1
Connec	Connection costs		7	4500		000,000			_															(180,000)	646,503
Operation & maintenance	intenance 0.02	02				41	41,126 41	41,126 41	41,126 41,126	126 41,126	6 41,126	6 41,126	41,126	41,126	41,126	41,126	41,126	41,126 4	41,126 4	41,126 41	41,126 41,	41,126 41,126	126 41,126	9	254,911
Power generation or import cost	port cost		0	0.075	P/kWh	2,	2,190 2	2,190 2,	2,190 2,190	90 2,190	0 2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190 2	2,190 2,	2,190 2,1	2,190 2,190	90 2,190	0	13,574
Total		-				•										_									2,392,118
Cost of electricity					P/kWh																	-	_		13
2-a SHS Electrification											_												-		
五	Households 30	300										_													
	Capacity 100	g																					-		
Annual consumption	sumption 0.365	591	4	43800	kWph/y	43	43,800 43	43,800 43	43,800 43,800	300 43,800	0 43,800	0 43,800	43,800	43,800	43,800	43,800	43,800	43,800 4	43,800 43	43,800 43	43,800 43,	43,800 43,800	300 43,800	0	271,483
Distance from Grid	from Grid 20	_	km																						(i = 0.15)
Investment costs (A)	costs (A)			6.3	P/Wp 2	2,889,000			H																2,512,174
Batter	Battery replace	-			Ы		1	30(300,000	_	300,000	90		300,000			300,000		3	300,000		300,000	000	(100,000)	1,097,751
Operation & maintenance: village	e: village			500 P/	P/Village/m	9	9 000'9	6,000 6,	000'9 000'9	000'9 00	000'9	000'9	90009	6,000	90009	9,000	000,9	9,000	_	6,000 6,		6,000 6,000	000'9 00		37,189
•	Agent fee		_	0.05	%	14	14,400 14	14,400 14	14,400 14,400	14,400	14,400	0 14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400 1	14,400 14	14,400 14,	14,400 14,400	14,400	0	89,255
H.	:Head office 27	276		276	P/H/y	8.7	82,800 82	82,800 82	82,800 82,800	82,800	82,800	0 82,800	82,800	82,800	82,800	82,800	82,800 8	82,800 8	82,800 82	82,800 82	82,800 82,	82,800 82,800	300 82,800	0	513,214
Total																									4,249,58
Cost of electricity					P/kWh																				15.
2-b Grid Electrification		-										_								_					
Ж	Households 30	300																							
Annual consumption	sumption	<u> </u>	 -	43800	kWph/y	43	43,800 43	43,800 43	43,800 43,800	300 43,800	43,800	0 43,800	43,800	43,800	43,800	43,800	43,800	43,800 4	43,800 43	43,800 43	43,800 43,	43,800 43,8	43,800 43,800	0	271,483
Distance from Grid		20				ļ																			(i = 0.15)
Investment costs (A)	costs (A)	<u> </u>	<u>-</u>	102816		2,056,320	\vdash	H				L												(411,264)	1,477,130
Connec	Connection costs		1	4500		1,350,000	\vdash		_			_	_									-		(270,000)	969,754
		H					-													-		_	_		
Operation & maintenance	intenance 0.02	25	\vdash	-		4	41,126 41	41,126 41	41,126 41,126	126 41,126	6 41,126	6 41,126	41,126	41,126	41,126	41,126	41,126	41,126 4	41,126 4	41,126 41	41,126 41,	41,126 41,126	126 41,126	9	254,911
Power generation or import cost	iport cost	_		0.075	P/kWh	3,	╙	3,285 3,	3,285 3,285	85 3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285 3	3,285 3,	3,285 3,2	3,285 3,285	85 3,285	25	20,361
Total			H	┢			⊢	⊢	-	⊢	⊢	⊢	╌												2,722,156
ricinita de la caracita		-	F	ľ			ŀ	-										1							

Appendix Table 7.1-2-3 Comparison of Grid Electrification and SHS

Sum of NPV	at 0 year				361,977	(i = 0.15)	3,349,565	1,463,668	37,189	119,006	684,285	5,653,714	15.6			361,977	(i = 0.15)	1,477,130	1,293,006	0	254,911	27,148	3,052,195	8.4				452,471	(i = 0.15)	4,186,957	1,829,585	37,189	148,758	855,356	7,057,845	15.6			452,471	(i = 0.15)	1,477,130	1,616,257	254,911	33,935	3,382,233	7.5
3,	residual							(133,333)										(411,264)	(360,000)												(166,667)							1			(411,264)	(450,000)				
	20				58,400				9,000	19,200	110,400					58,400					41,126	4,380						73,000				9,000	24,000	138,000					73,000				41,126	5,475		
	19				58,400			400,000	000'9	19,200	-	-				58,400					41,126	4,380						73,000			500,000	9,000		138,000	1				73,000				41,126	5,475		
	18				58,400				9,000	-	_					58,400					41,126	4,380						73,000				9,000	24,000	138,000					73,000				41,126	5,475		
	17				58,400	-			000,9	+	-	_				58,400					41,126	4,380						73,000				9,000	24,000	138,000				_	73,000				41,126	5,475		_
	16				58,400			400,000	000'9	-			Ī			58,400					41,126	4,380						73,000			500,000	9,000	24,000	138,000				_	73,000				41,126	5,475		
_	15				58,400			4	9000	+	-				r	58,400					41,126	4,380			 -			73,000			5	9000,9	24,000	138,000 1		1	1	-	73,000				41,126	5,475		
	4				58,400				9000	+	_				-	58,400				l	41,126	4.380						73,000				900,9		138,000 1		7	1		73,000				41,126	5,475		_
	13				58,400 3			400,000		-	-					58,400					41,126	₩	T					73,000			500,000			138,000 1				_	73,000				41,126	5,475		_
	12				58,400 5			4	000'9	+	-					58,400 5	-				41,126	-						73,000			5	_	24,000 2	138,000 1				_	73,000				41,126	5,475		_
	=======================================				58,400 5				000'9	┰	-			-	-	58,400 5	-				41,126 4	-	⊢	-	 			73,000 7	_			-		138,000 1:		1		-	73,000 7				41,126 4	5,475	_	
	10				58,400 5			400,000		┿			l			58,400 5	_			ŀ	41,126 4	-	╌					73,000 7	₩		500,000	9,000	24,000 2	138,000 13	1			_	73,000 7				41,126 4	5,475		_
	6				58,400 5			4	9 000'9	+-	-		-			58,400 5	_				41,126 4	-	⊢	_	\vdash			73,000 7	-	-	20	9 000'9	24,000 2	138,000 13		+		_	73,000 7				41,126 4	5,475		
	00	t			58,400 58		_		9 000'9	+	_					58,400 5	_				41,126 4	+	⊢					73,000 7	-			ш	24,000 2	138,000 13				\rightarrow	73,000 7				41,126 4	5,475 5		
	7	+	_		58,400 58			400,000		┰	-					58,400 5	⊢	\vdash	H	H	41,126 4	+-	⊢					73,000 7	-		500,000	9 000'9	24,000 2	138,000 13	1			_	73,000 7				41,126 4	5,475		
	9				58,400 58			9	9 000'9	-						58,400 58	┺-	-	ŀ	-	41,126 41	-	+					73,000 7	-	L	50	9 000'9		138,000 13	1	+	+	_	73,000 7:	-	-		 41,126 4	5,475 5		
	5				58,400 58	_			9 000'9	+	-		H	_		58,400 58	_		\vdash		41,126 41	-	-		\vdash			73,000 73				9 000'9	24,000 24	138,000 13				_	73,000 73				41,126 41	5,475 5		_
	4	╁			58,400 58			400,000		-			H	H		58,400 58			H	t	41,126 41	_	₩					73,000 73	\vdash		500,000	9 000'9			1				73,000 73				41,126 41	5,475 5		_
	3				58,400 58		-	94	9 000'9	+	110.400 110		H	H	_	58,400 58			H	<u> </u>	41,126 41	_	-		\vdash	L	<u> </u>	73,000 73			20		24,000 24	3,000	_	_	\dashv	_	73,000 73				41,126 41	5,475 5		
	2	<u> </u>	L		58,400 58				6,000	-	110.400 110		<u> </u>		<u> </u>	58,400 58			<u> </u>	ŀ	41,126 41	_	-			_	\vdash	73,000 73	_				24,000 24	138,000 138,000 138,000		_			73,000 73	_			41,126 41	5,475 5,		
			H		28		99,		9	1 2	<u> </u>	+	╀	-		58		320	00		4	4			\vdash	_	-	73		00,		9	24	138	+			+	73		2,056,320	000,	41	٠,		
	1		L		_	_	3,852,000	1	m/	-	\perp	\perp	L	\perp	_	_		2.056.320	1.800.000		-	ļ_	L	L	-	_		_		4,815,000	\vdash	/m	_		4	_	\dashv	\dashv	2	_	2,056	2,250,000		_		_
	Units				kWph/y		P/Wp	Ы	P/Village/m	%	P/H/v		P/kWh			kWph/y						P/kWh		P/kWh				kWph/y		P/Wp	Ь	P/Village/m	%	P/H/y		P/kWh			kWph/y					P/kWh		P/kWh
	Unit cost				58400		96.3	200	200	0.05	276					58400		102816	4500			0.075						73000		96.3	200	500	0.05	276					73000		102816	4500		0.075		
	Units	-		Wp		km		T		<u> </u>	T	T					-			T		t		l				-	Ē								7		1							_
	Variables 1		400	100	0.365	20					276		T	-	904		20			t	0.02					200	100	0.365	50					276	1			200		20			0.02			_
	>	T	lds(H)	Capacity		n Grid	ts (A)	eplace	village	Agent fee	:Head office	\vdash	+		Households	nption	n Grid	ts (A)	1 costs		enance	yr cost		L		Households	Capacity	Ļ	n Grid	its (A)	cplace	village	Agent fee	:Head office	1	1		Households	mption	m Grid	sts (A)	n costs	enance	ort cost	1	_
		-a SHS Electrification	Households(H)	Ca	Annual consumption	Distance from Grid	Investment costs (A)	Battery replace	Operation & maintenance: village	Age	:Head	Total	Cost of electricity	1-b Grid Electrification	İ	Annual consumption	Distance from Grid	Investment costs (A)	Connection costs		Operation & maintenance	Power generation or import cost	Total	Cost of electricity	2-a SHS Electrification	House	2	Annual consumption	Distance from Grid	Investment costs (A)	Battery replace	Operation & maintenance: village	Age	:Head	Total	Cost of electricity	Grid Electrification	Hous	Annual consumption	Distance from Grid	Investment costs (A)	Connection costs	Operation & maintenance	Power generation or import cost	Total	Cost of electricity
-		-a S	\vdash	\vdash	-	-	-	\vdash	H	+	+	+	+	<u>ق</u>	+	\vdash	\vdash	H	H	+	H	\vdash	\vdash	\vdash	-a SI			\vdash	\vdash	-	\vdash	Н		\dashv	┪	\dashv	<u>5</u>	\dashv	1	┪				\dashv	\dashv	_

Appendix Table 7.1-3-1 Comparison of Grid Electrification and SHS

Sum of NPV	at 0 year				45,247	(i = 0.15)	418,696	182,959	37.189	14.876	85 536	2	16.3			45.247	(i = 0.15)	487,453	161,626	0	84,121	3,394	736,593	16.3				90,494	(i = 0.15)	837,391	365,917	201,107	171.071	1,441,320	15.9			90,494	(i = 0.15)	945,363	323,251		163,143	6,787	1,438,544
Sum	residual at					i)		(16,667)			-	+	+	+	+		j.	(135,717)	(45,000)									+	ij	4	(33,333)	+	-		-		$\frac{1}{1}$	-	<u> </u>	4	(000,06)	+	+	+	1
_			_	4	0			(16,	-	2 9	2 8	3	+	+	-	9	L	(135	(45,	_	72			_		4	-	8	+	+	-	2 2	2 8	_	-	Н	_	8		(563	8	1	21	2	-
	70	Н			0 7,300			2	9	+-	4	_	+	+	+	0 7.300	₩	_	_		13,572	548				-	_	00 14,600	-			0,000	4-	-		H		00 14,600			-		-	1,095	
	19				7,300			50,000	⊢	+	-	_	+	+	-	7300	╀	-			2 13,572	548				_	\downarrow	14,600	-	-	+	+	27,600	_	-			0 14,600			_	-	-+	5 1,095	
	18				7,300				900		_	_	1		1	7.300	╀		_	L	2 13,572	548				_		0 14,600		_	-	+	27,600	-				0 14,600				\rightarrow	-	1,095	
	17				7,300			L	9	+	_	_				7 300	╀	_		L	13,572	548						14,600				-	27,600	_				14,600					-	1,095	
	16				7,300			50,000	⊢	+-	_	-			\perp	7 300	╀	_			13,572	548						14,600			+	+	27,600	-				14,600					26,321	1,095	
	15				7,300			L	8	+	-	-		ļ		7 300			L	ļ	13,572	548						14,600			-	+	27,600	-		L,		14,600					26,321	1,095	
	14				7,300				9	20,0	-	-				7 300					13,572	548						14,600				000,0	27,600	_				14,600					26,321	1,095	
	13				7,300			50,000	9	8,6	2,400	0,00				7 300	2				13,572	548						14,600			100,000	000,0	77.600	-				14,600					26,321	1,095	
	12				7,300				9	9,000	2,40	13,800				7 300	2004				13,572	548						14,600			1	000,4	37.600	000,14				14,600					26,321	1,095	_
	11				7,300				4	33,6	12 000	13,800				7 300	2				13,572	548						14,600				6,000	37.600	000,13				14,600					26,321	1,095	
	10				7,300			50,000	8	9,000	2,400	13,800				7 300	2004				13,572	548						14,600			100,000	9000'9	37.500	20,77				14,600					26,321	1,095	
	6				7,300				8	0000	2,400	13,800		1	Ī	7 300	2004,				13,572	548						14,600				000,9	4,800	2000,17				14,600					26,321	1,095	
	∞				7,300				9	200,0	-	13,800		1		7 300	30.				13,572	548						14,600				000,9	9,800	7,000				14,600					26,321	1,095	
	7				7,300	-		50,000	8	000,0	-	13,800		1		7 300	2051,	İ	Ī	T	13,572	-						14,600			100,000	000,9	4,800	300,12				14,600					26,321	1,095	
	9				7,300			T	8	+	-	13,800		1	1	7 305	2		T	T	13,572	-						14,600			$\boldsymbol{+}$	000,9	4,800	+				14,600					26,321	1,095	
	2				7,300	⊢		T	900	+	_	13,800	+	†	1	7 300	2000,			T	13,572	-						14,600			-+	+	4,800	_		T		14,600	-				26,321	1,095	
	4				7,300	┢	-	50,000	┿	+	-+-	13,800		\dagger	\dagger	7 300	┿	+		t	13,572	┪	T					14,600			+	+	4,800	+-	1			14,600	╫┈			П	26,321	1,095	
	е.	\perp			7,300 7	<u> </u>		1 2	┸	4	-	13,800	+	+	+	7 300	╀	$\frac{1}{1}$			13,572	<u> </u>	╀					14,600 1		-	-	-	4,800		+			14,600				Н	26,321 2	1,095	
		-			7,300 7,3	╄		H	+	-		13,800 13,	+	+	+	7 300	+-	+		-	13,572 13,	_	╁		H	_		14,600 14,		1	-	-		7,7000,77	-	+		14,600 14,			H		26,321 26	1,095	
_			_		7,3		8	_		9	2,4	1	+	+	+	7.3	;	88	8 8	-	13,	1 2			<u> </u>			14,		8	-	9,	₹ ;	,,	ł	 	_	14,		045	00	Н	26,		
	-	-					481.500	2	1	E I	1	4	1	\downarrow	1	\downarrow	1	678 586	225 000		-	-	_				Ц	_	\dashv	963,000	4	E .	\downarrow	1	_	_		L		1,316,045	450,000	Ц		\downarrow	
	Units				kWph/y		P/Wp	2	11.72.0	P/vulage/m	0%	r/H/y	22.04	P/KWD		LWah/u	v v pur)					P/kWh		P/kWh				kWph/y		P/Wp	а	P/Village/m	%	r/n/y	P/kWh			kWph/y						P/kWh	
	Unit cost				7300		96.3	500	1	onc S	0.05	9/7				7200	867	102816	4500	2005		0.075						14600		96.3	200	200	0.05	2/0				14600		102816	4500			0.075	
	Units	T		Wp		km	-		\dagger	\dagger	\dagger	+	\dagger	\dagger	\dagger	\dagger	\dagger	\dagger	H	\dagger	t		+				Wp		km	\dashv	+	\dagger	\dagger	+	T		\vdash	-				H			-
	Variables		50	┢	0.365	├-	H		\dagger	\dagger	1	9/7	+	+	-	8	99	+		I	0.02					100	100	0.365	12.8	1	\dagger	\dagger	13	7			100		12.8				0.02	1	
	<u> </u>	\perp	(H)sp	Capacity	L	┺	L	place		/Illage	Agent rec	ottice	+	\dagger	11	en oites	Grid		(C) Si		1_	L				(H)spi	Capacity			ts (A)	eplace	village	Agent fee	20110	+		splods	nption	<u> </u>	Ш	1 costs	Н		rt cost	
			Households(H)	[5]	Annual consumption	Distance from Grid	Investment costs (A)	Battery replace		Operation & maintenance: village	Age	:Head office		ctricity		Annual continuation	Distance from Grid		Connection costs		Operation & maintenance	Power generation or import cost		tricity		Houscholds(H)	ථි	Annual consumption	Distance from Grid	Investment costs (A)	Battery replace	Operation & maintenance: village	Ag	Tread UIIIC	tricity		Households	Annual consumption	Distance from Gric	Investment costs (A)	Connection costs		Operation & maintenance	Power generation or import cost	_
		ification			Annı	Dis	1	TIIAC		on & maii			Total	Cost of electricity	ification		ا ا	<u>.</u>			Operation	generatio	Total	Cost of electricity	ification			Ann	Dis	Inve		on & mai		Total	Cost of electricity	ification		Ann	ij	Inve	ľ		Operation	r generation	Total
		SHS Electrification								Operation			1	1	1-b Grid Electrification							Power	:	٥	2-a SHS Electrification							Operati				2-b Grid Electrification								Power	
_		1-a SI		H	\vdash	t	T	+	t	t	\dagger	+	+	1	1-6-	\dagger	t	t	t	\dagger	+		T		2-a S	Н	Н	\exists	\forall	\dashv	\dagger	+	\dagger	\dagger		2.b		T	r			П		\dagger	

Appendix Table 7.1-3-2 Comparison of Grid Electrification and SHS

							F	H	L	L	F	L		L							-	\mid	-	ت	Sum of NPV
	Variables	Units	Unit cost	Units	1	2	E	4	5	6 7	8	6	<u> </u>	=	12	13	41	51	16	17	81	19	700	residual	at 0 year
SHS Electrification							+	+	+	+	-	+	1	_				\dagger			\dagger				
(H)Sepolds(H)	500								<u> </u>		-	-													
Capacity	100	Ψp										_		_											
Annual consumption	0.365		29200	kWph/y		29,200	29,200	29,200 29	29,200 29	29,200 29,2	29,200 29,200	00 29,200	0 29,200	29,200	29,200	29,200	29,200	29,200	29,200	29,200	29,200	29,200 2	29,200		180,988
Distance from Grid	25.1	ķ					_	-	-																(i = 0.15)
Investment costs (A)			96.3	P/Wp	1,926,000																				1,674,783
Battery replace			200	Ь			2	200,000		200,	200,000		200,000	0		200,000		ľ	200,000		2	200,000		(66,667)	731,834
Operation & maintenance: village			200	P/Village/m		9000	000'9	9 000'9	9 000'9	9 000'9	000'9 000	000'9	000'9	9000	9,000	000'9	000'9	9000	9000	9000	000'9	000'9	000'9		37,189
Agent fee			0.05	%		-	009'6	_	6 009'6	009'6 009'6	009'6 00'	009'6 00	⊢	009'6	⊢	009'6	009'6	009'6	ш	009'6	009'6	6,000	009'6		59,503
:Head office	276		276	P/H/y		-	-	-	55,200 55	55,200 55,2	55,200 55,200	00 55,200	0 55,200	55,200	55,200	55,200	55,200	55,200	55,200	55,200	55,200 5	55,200 5	55,200		342,142
Total						_																			2,845,451
Cost of electricity				P/kWh																					15.7
Grid Electrification											_														
Households	200										_														
Annual consumption			29200	kWph/y		29,200	29,200 2	29,200 29	29,200 29	29,200 29,2	29,200 29,200	00 29,200	0 29,200	002'62	29,200	29,200	29,200	29,200	29,200	29,200	29,200	29,200 2	29,200		180,988
Distance from Grid	25.1								_				_												(i = 0.15)
Investment costs (A)			102816		2,580,682					_													3)	(516,136)	1,853,798
Connection costs			4500		000'006																		C	(180,000)	646,503
Operation & maintenance	0.02					51,614	51,614 5	\rightarrow	51,614 51	51,614 51,6	51,614 51,614	14 51,614	4 51,614	1 51,614	51,614	51,614	51,614	51,614	-	-	-+	_	51,614		319,913
Power generation or import cost			0.075	P/kWh		2,190	2,190	2,190 2	2,190 2,	2,190 2,1	2,190 2,190	30 2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190		13,574
Total												_		_				1	1	+					2,833,788
Cost of electricity				P/kWh			\dashv	\dashv	\dashv	+	\dashv	-	\downarrow	_				1		1		1			15.7
SHS Electrification							1	1	+	-	1	1	\downarrow	_					1						
Households(H)	300						\dashv	\dashv	+	\dashv	1	\dashv								†	1				
Capacity	100	Wp								1								1	\rightarrow	1	1				
Annual consumption	0.365		43800	kWph/y		43,800	43,800 4	43,800 40	43,800 43	43,800 43,8	43,800 43,800	00 43,800	0 43,800	3 43,800	43,800	43,800	43,800	43,800	43,800	43,800	43,800	43,800 4	43,800		271,483
Distance from Grid	37.7	ĸ																							(i = 0.15)
Investment costs (A)			96.3	P/Wp	2,889,000																				2,512,174
Battery replace			200	Ь			3	300,000		300,	300,000	_	300,000	0		300,000			300,000		3	300,000		(100,000)	1,097,751
Operation & maintenance: village			П	P/Village/m		9,000	9,000	9 000'9	6,000 6,	6,000 6,0	6,000 6,000	900'9 00	000'9 0	90009	9,000	9,000	000'9	9,000	9000	9000	9000	_	000'9		37,189
Agent fee			0.05	%			14,400	_	14,400 14	14,400 14,4	14,400 14,400	00 14,400	0 14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400		89,255
:Head office	276		276	P/H/y		82,800	82,800	82,800 8;	82,800 82	82,800 82,8	82,800 82,800	00 82,800	0 82,800	82,800	82,800	82,800	82,800	82,800	82,800	82,800 8	82,800 8	82,800 8	82,800		513,214
Total							1	\dashv	\dashv	\dashv	$\frac{1}{1}$	4	\downarrow	\downarrow					7	+					4,249,582
Cost of electricity				P/kWh			1		+											\dagger					15.7
-b Grid Electrification							1	1	\dashv	\dashv	\dashv	\downarrow	_	\downarrow						+	1	1			
Households	300					_	_	\dashv	1				_					1	1	-	_	_	1		
Annual consumption			43800	kWph/y		43,800	43,800	43,800 4	43,800 43	43,800 43,8	43,800 43,800	00 43,800	43,800	7 43,800	43,800	43,800	43,800	43,800	43,800	43,800	43,800	43,800 4	43,800		271,483
Distance from Grid	37.7							-	1				_					1		_	1				(i = 0.15)
Investment costs (A)			102816		3,876,163				1											+				(775,233)	2,784,389
Connection costs			4500		1,350,000				1										1				3	(270,000)	969,754
							\rightarrow	-	1	+	-	\dashv						1	1		-	-			
Operation & maintenance	0.02					_	$\overline{}$	-+	77,523 77	77,523 77,5	77,523 77,523	23 77,523	3 77,523	-	77,523	77,523	77,523	\rightarrow	\rightarrow	77,523	\rightarrow	-	77,523		480,507
Power generation or import cost			0.075	P/kWh		3,285	3,285	3,285 3	3,285 3,	3,285 3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285		20,361
Total								1	+	+	+	1	-			1					-				4,255,012
Cost of electricity				P/kWh]	\dashv	\dashv	+	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	\downarrow				1	1	1		-		1	15.7

Appendix Table 7.1-3-3 Comparison of Grid Electrification and SHS

					_	_		_	_	-								-	_	-	-			30111011111
	Variables	Units	Unit cost	Units	-	2	3	4	~	9	7	6	100	=======================================	12	13	14	15	16	17	81	19	20 residual	
SHS Electrification					L	-				\vdash		<u> </u>	\vdash	-	_									
Households(H)	H) 50																	-						
Capacity	ity 200	Wp																						_
Annual consumption	on 0.365		14600	kWph/y		14,600	14,600	14,600	14,600	14,600	14,600 14	14,600 14,600	14,600	009'11	0 14,600	14,600	14,600	14,600	14,600	14,600	14,600	14,600 14,600	009	90,494
Distance from Grid	id 13.7	km												_										(i = 0.15)
Investment costs (A)	L_		96.3	P/Wp	963,000	Q																		837,391
Battery replace	8		200	۵.			L	100,000		=	100,000		100,000	8	_	100,000			100,000		10	100,000	(33,333)	3) 365,917
Operation & maintenance: village	- S		200	P/Village/m	E	9000	9,000	900,9	9000	9 000'9		6,000 6,0	000'9 000'9	000'9	9,000	9,000	9,000	9,000		000'9	9 000'9		90009	37,189
Agent fee	.8		0.05	%	_	4,800	-	4,800	⊢	⊢	╀	-	├	╄	\vdash	⊢	⊢	4,800	\vdash	⊢	⊢	4,800 4,800	8	29,752
:Head office	co 276		276	P/H/y		13,800	_	ᆫ	+-	+-	+-	+-	⊢	₽-	┺	╄	₩	+	-	١.	\vdash	⊢	008	85,536
Total	L				L		_	ㅗ	-	-	+	+-	-	₽-	-	-	-	-	-	-	-	-		1,355,78
Cost of electricity				P/kWh						+	-					L						-	_	15.0
1-b Grid Electrification					L							ŀ						İ		l	H	_		
Households	ds 50				L							<u> </u>	_	_		_						_		
Annual consumption			14600	kWph/y	_	14,600	14,600	14,600	14,600	14,600 1	14,600 14	14,600 14,0	14,600 14,600	00 14,600	0 14,600	14,600	14,600	14,600	14,600	14,600	14,600	14,600 14,600	009	90,494
Distance from Grid	id 13.7				_				-	-	-	-	-	-	_	┿	₩		-					(i = 0.15)
Investment costs (A)			102816		1,408,579	62										_							(281,716)	16) 1,011,834
Connection costs	sts		4500		225,000	9				-				_									(45,000)	0) 161,626
																							-	
Operation & maintenance	ce 0.02					28,172	28,172	28,172	28,172	28,172 28	28,172 28	28,172 28,3	28,172 28,172	72 28,172	2 28,172	28,172	28,172	28,172	28,172	28,172	28,172 2	28,172 28,172	172	174,614
Power generation or import cos	Ļ		0.075	P/kWh		1,095	_	1,095	<u> </u>	1,095	1,095	1,095 1,095	95 1,095	5 1,095	1,095	1,095	1,095	1,095	1,095	1,095	1,095	1,095 1,095	95	6,787
Total																								1,354,861
Cost of electricity				P/kWh																				15.0
2-a SHS Electrification					_																		-	
Households(H)													-					1	1		-	1	_	
Capacity		Wp				_	_					-	_				_	_	-		+	-	-	_
Annual consumption	_		29200	kWph/y		29,200	29,200	29,200	29,200	29,200 29	29,200 29	29,200 29,3	29,200 29,200	29,200	002'62	29,200	29,200	29,200	29,200	29,200	29,200	29,200 29,200	000	180,988
Distance from Grid	rid 27	km				-															1	1	_	(i = 0.15)
Investment costs (A)	(F		96.3	P/Wp	1,926,000	00																		1,674,783
Battery replace	8		200	4				200,000		ಸ	200,000		200,000	8		200,000		_	200,000		50	ᅱ	(66,667)	
Operation & maintenance: village	28		200	P/Village/m	E	90009	-	900,9	-+	-+	\rightarrow	-	-	-+	-	\dashv	9,000	\dashv	\dashv	\dashv	\rightarrow	\dashv	90009	37,189
Agent fee			0.05	%		009'6	_		_	-	_	_	_	_	_	_	-	_	_	-	-	-	8	59,503
:Head office	276		276	P/H/y		27,600	27,600	27,600	27,600	27,600 2	27,600 27	27,600 27,0	27,600 27,600	27,600	27,600	27,600	27,600	27,600	27,600	27,600	27,600 2	27,600 27,	27,600	171,071
Total						4	\int			1		1		-					+	1	1			2,674,38
Cost of electricity				P/kWh		-	\int					+	-	-					+		+		-	14.8
Grid Electrification						-				1	1	1	_	4							1		-	
Households	ds 100													-							+		_	_
Annual consumption			29200	kWph/y		29,200	29,200	29,200	29,200	29,200 29	29,200 29	29,200 29,3	29,200 29,200	00,29,200	0 29,200	29,200	29,200	29,200	29,200	29,200	29,200 2	29,200 29,	29,200	180,988
Distance from Grid	rid 27																				_		_	(i = 0.15)
Investment costs (A)	(F		102816		2,776,032	32																	(555,206)	06) 1,994,125
Connection costs	sts		4500	<u> </u>	450,000	0																	(90,000)	0) 323,251
Operation & maintenance	ce 0.02					55,521		55,521	55,521	55,521 5	55,521 55	55,521 55,5	55,521 55,521	21 55,521	1 55,521	55,521	55,521	55,521	55,521	55,521	55,521 5.	55,521 55,521	521	344,130
Power generation or import cost	set		0.075	P/kWh		2,190	2,190	2,190	2,190	2,190 2	2,190 2	2,190 2,190	90 2,190	0 2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190 2	2,190 2,190	8	13,574
Total																								2,675,080
					_		Ļ	L		ſ														ĺ

Appendix Table 7.1-3-4 Comparison of Grid Electrification and SHS

Notable Unit Lange Lan																					_	_		_	
The controlled 20.0 W W W W W W W W W		Variables	Units	Unit cost	Units	1	2		4				6	01	=	12	13		15					residual	at 0 year
Charmonic Control Char	SHS Electrification																			Н	Н				Ц
State Stat	Households(H)	200								_															
Marche M	Capacity	200	Wp								_							_			_				
Particle Particle	Annual consumption			58400	kWph/y		-	-	\blacksquare	_	_	\vdash		\vdash	58,400	58,400	-		-				-	Q	361,977
Particularies State Stat	Distance from Grid	53.5	km																	_					(i = 0.15)
National contract region 200 10 mag 200	Investment costs (A)			6.3	P/Wp	3,852,000																			3,349,565
Statistical Control	Battery replace			200	Ь			1	000'00		400,0	8		400,000			400,000		4	0000		400,0	000	(133,333)	1,463,668
Appendix Appendix	Operation & maintenance: village			Г	P/Village/m		9000	-	▙	⊢	⊢	⊢	⊢	⊢	900,9	9000	000'9	⊢	⊢	⊢	H	⊢	┝	-	37,189
Householder 27,	Agent fee			Г	%		_	_	_	-	-	-	_	-	19,200	19,200	-	-	_	-	-	₩-	-	0	119,006
Figure F	:Head office			276	P/H/y			_	-	₩	-	-		_		55,200	_	—	-	_	_	_	-	0	342,142
Figure F	1		T						_	-	-	-	_	-	-		_	-	-	—	_	-	_		5,311,571
Figure F	Cost of electricity				P/kWh																		_		
Householded 200 State	Grid Electrification								-									T							
State Stat									-		_														
State Control of State Con	Annual consumption			58400	kWph/y					_				-		58,400		_	-		_	_	_	0	361,977
Contaction cold Contaction	Distance from Grid	53.5							L				L							-					(i = 0.15)
Controller costs Controller	Investment costs (A)			102816		5,500,656			-															(1,100,131)	3,951,322
No. 10, 20, 20, 20, 20, 20, 20, 20, 20, 20, 2	Connection costs		-	4500		000'006			-				_					ļ						(180,000)	646,503
of the problement of the									-																
Description of the part of the	Operation & maintenance	0.02					110,013	110,013		-				_	110,013				_	_	_	\rightarrow		13	681,887
Householder Householder	Power generation or import cost			0.075	P/kWh		_	_	_		-		-	-	4,380	4,380	4,380	-	-	\dashv	-	\dashv	\dashv	0	27,148
Householde(ii) 300 Wp	Total		1						-		_	_						+		1	_	-			5,306,860
Householide(H) 300 Wp Capacity 300 Wp Wp Wp Wp Wp Wp Wp	Cost of electricity				P/kWh					_	_		_									-	+		
High-candinglethy 300 Wp	SHS Electrification									_											-		_		
Capacity 200 Wp S7600 KPAPA S77600	Households(H)																								
Street Discription Street Outcomess Street	Capacity	200	Wp										_							_	_		$\frac{1}{1}$		
Statistic Stat	Annual consumption	0.365	1	87600	kWph/y		_	_	-	_	_	_	\rightarrow	_	87,600	87,600		_	_	_	_	-	-	0	542,965
Statistic costs (A) Solid Costs (A) Solid	Distance from Grid	80	km																	-	\dashv		-		(i = 0.15)
Battety replace 500 P P 600,000	Investment costs (A)		1	96.3	P/Wp	5,778,000		1	1	-	1	-	-				1		1	1	+				+
Agent tea	Battery replace			200	4	:		٦	000,000		900,	900	_	000,009			000,009		99	0000		900)(90	(200,000)	,2
Agent free 0.05 % 6 28.800 28.	Operation & maintenance: village		1	500	P/Villagc/m					-+	\dashv	_	-	-+	9,000	9,000		_	_	-+	-	\rightarrow	\rightarrow	0	37,189
Households	Agent fee			0.05	%				_		-	_	\rightarrow	\rightarrow	28,800	28,800	_	_	_		-	-	_	0	178,509
Households 300 Househ	:Head office	[276	P/H/y				_		_	_		\dashv	82,800	82,800	_		_		-	-	_	0	513,214
Households 300 F/kWh 87,600<	Total																				-	-			7,948,762
Households 300	Cost of electricity				P/kWh						-		_										_		_
300 80 87600 kWpty 87600 87,60	Grid Electrification									-			_												
80 87600 kWphy 87600 87,600 87	Households	300								_			_					1	-	_	_	\rightarrow	_	-	
80 102816 8,225,280 4 24500 164,506 164,506 164,506 6,570 6,	Annual consumption			87600	kWph/y				_	-4	_	_	_	_	_	87,600	_	-	_	_		_	-	0	542,965
102816 8,225,280 4500 4500 1,350,000 100.2	Distance from Grid		1															\dashv	\exists		\dashv			_	4
4500 1,350,000 1,450,000 1	Investment costs (A)		7	102816		8,225,280			\dashv	-								1		+	-	4	-	(1,645,056)	~
0.02 0.02 164,506 164,	Connection costs			4500		1,350,000															-	-		(270,000)	969,754
0.02 164.506 1																									
0.075 P/RWh 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570 6,570	Operation & maintenance						164,506	164,506				_	_	\rightarrow		164,506	164,506				\rightarrow	_		8	1,019,644
Total	Power generation or import cost			0.075	P/kWh		6,570		-	\dashv	-	-		-	6,570	6,570	-	\rightarrow	-		-	-	-	_	40,722
THO I	Total		_				_	_	_	-	-	-	-		Ĺ				_	_	-		•		

Appendix Table 7.1-3-5 Comparison of Grid Electrification and SHS

1
20.200 20
20,000 2
20,000 29,200 2
29,200 2
20,0000 20,000
200,000 6,
5,000 6,00
56.00 6,000 <th< td=""></th<>
9,000 9,600 <th< td=""></th<>
13,800 1
29,200 29
25.200 29
29.200 29
29.200 2
29.200 29,200 29
57,166 57,166<
57.166 57.160 57.160 57.160 57.160 57.160 57.160 57.160<
57,166 57,166<
57.166 57.166<
57,166 57,169 57,169 57,169<
57,166 57,166<
2,190 2,190
38,400 38,400 58,400<
58,400 58,400<
58,400 59,200 19,200<
58,400 58,400<
58,400 59,200 19,200<
58,400 58,400<
58,400 58,400<
400,000 6,000 <
400,000 400,000 <t< td=""></t<>
400,000 400,000 <t< td=""></t<>
6,000 19,200 19
19,200 19,200 19,200 19,200 19,200 19,200 19,200 19,200 19,200 19,200 19,200 19,200 19,200 27,600 2
27,600 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400 28,400<
58,400 58,400
38,400 58,400
58,400 58,400<
58,400 58,400<
58,400 58,400<
113,714 113,71
113,714 113,71
113,714 113,71
113,714 113,71
113,714 113,71
113,714 113,71
4,380 4,380 4,380 4,380 4,380 4,380 4,380 4,380 4,380 4,380
4

Appendix Table 7.1-3-6 Comparison of Grid Electrification and SHS

National Line National Lin	Sum of NPV	at 0 year				723,953	(i = 0.15)	6,699,130	2,927,336	37,189	238,012	342,142	10,243,811	14.1			723,953	(i = 0.15)	8,124,213	646,503		1,402,010	54,297	10,227,023	14.1				1,085,930	(i = 0.15)	10,048,696	37.189	357,018	513,214	15,347,121	14.1			1,085,930	(i = 0.15)	12,186,320	969,754		2,103,015	81,445	15,340,534
Value Color one Color on	Sur						(i	9	<u> </u>				<u> </u>	-				i)	Щ	Ц		-		-		-	1	+	+	<u>:</u>	+	+			1.			+		_	12	_	-	7		_
Variable Variable		resi				00			(266	-	٥	0		L			00		(2,26)	(180		35				_	_	4	2	\downarrow	- 1	+		0					8		(3,39)	(270		33		_
Vising Calibra Calib		50				$\overline{}$				9,000	╁	+-	+				_						8,760				_	-	-+				+	\vdash					_				\neg	\neg	\neg	-
Value Valu		19				116,800			800,000	9,000	38,400	55,200					116,800					226,195	8,760									1,200,000	57,600	82,800					175,200					339,293	13,140	
Value Valu		18				116,800				9,000	38,400	55,200					116,800					226,195	8,760						175,200			000 9	57,600	82,800					175,200					339,293	13,140	
National Charles Nati		17				116,800				6,000	38,400	55,200					116,800					226,195	8,760						175,200			6 000	57,600	82,800					175,200				į	339,293	13,140	
Number color Numb		16				116,800			800,000	9,000	38,400	55,200					116,800					256,195	8,760						175,200			6,000	57,600	82,800					175,200					339,293	13,140	
National Designation National Designation		15				16,800				6,000	38,400	55,200		T			16,800					26,195	8,760						75,200		Ì	+	27,600	82,800					75,200					139,293	13,140	
Notable Unit		41		-						-	-	-	+	T					_				⊢									+	_	-					75,200 1				_	_		
Variables Unit Un		13							000,000	_	-	_			-	 -	16,800 1				-		_				1	_	_	+		_	-	-					75,200 1							
Householde(I) 200 10 10 10 10 10 10 10		12	-	-					8	-	-	_	_						-				-				1					_	_	-					75,200 1							•
Parabele Units Para		11				16,800	-		-	₩.	—		_				16,800 1						ı							+	\dagger	+	_	_			H		75,200 1							
Householded(T) 200 11,650 Units one Units on		01							000,000	-					-		16,800					26,195 2	-				-	_	_	+	+	L	-	-											_	
Householde(H) 200 116,810 10 linit cost 10 linit cos		6	-			116,800 1			∞	-							116,800					226,195 2	├	-				_	_		1	-	-	-												
Principale Pri		∞				-				9,000	╁╌	+	+				-						8,760						_		1	000	+	_	\vdash				\neg				\dashv	\dashv	_	
Household (1) 200		7				I		-	000,00	9,000	上	┸	┸				ł		-			ш	8,760					_	_			# 00		┖	L						_		_		L	
Households(H) 200 Variables Unit cost	9				16,800			×	-	-	-	_		H		16,800			-			⊢								1	_	-	-	-				75,200 1								
Householde(H) 200 Vap Line Only White Only Lin		ν,	-	_						H	╈	╁	╁				_	_				-	┝					_	_			+	+	+	┢				_				-	-+	+	
Householde(H) 200 Wp 116800 KWphy 116800 116,8		4	<u> </u>			1			0,000	L.	_	┸		-			1						<u> </u>					- 1	- 1				ᆚ_	↓_	L							_	i			
Households(H) 200 Units Unit cost Units Units Unit cost Units Unit cost Units Unit cost Units Units Unit cost Unit cost Units Unit cost Units Unit cost Unit cos						6,800 11			8	+-							6,800 11		H	_	 	6,195 22		-				-	5,200 17	\dashv	+	_				H			5,200 17				_	9,293 33		
Nariables Units Unit cost Units 1		7				6,800 11		L		٠.	-	_					6,800 11	_				6,195 22	,760						5,200 17	1	+	+				_			5,200 17					9,293 33		
Nariables Unit cost Units						Ē		900,41	-	1,	38	55	-		<u> </u>		É		09,760	000'(22	80						17.		56,000	+	57	82					17.		64,640	000,07		33	1	
Nariables Unit cost			<u> </u>			y/r		\vdash	+	te/m		.>	_	4	<u> </u> 	_	k/ι	L	11,3	06			γ.		/h		-	-	ب/ _۲	\dashv	+	#/e		, v		Vh.			χ́ς.		16,9	1,3:		+	됩	
Households(H) 200 Households(H) 200 ual consumption 0.365 same from Grid 110 km same from Grid 110 km same from Grid 110 Households 200 Households 200 ual consumption 0.365 same from Grid 110 cetricity Households 300 Households(H) 300 Households(H) 300 Households(H) 300 Baltery replace from Grid 165 stance from						⊢	┢	P/W	<u>a</u>	P/Villag	%	P/H/v		P/KW	_		┢	Н					P/kW		P/kW		_	\dashv	\dashv	-	₽\¥	q nelliv/q	%	P/H/		P/kW			-					+	+	
Households(H) 200 Households(H) 200 Capacity Batter replace Head office 276 Head office 276 Households 200 Households 2		Unit cost				116800		96.3	2005	200	0.05	276					116800		102816	4500			0.075						175200		96.3	8 8	0.05	276					175200		102816	4500			0.075	
Households(H) Batter in Capacity Utal consumption Batter in Capacity Batter in Pagent free Head office Head office Households Is stance from Grid Stance from Grid Stance from Grid Stance from Grid Households Households(H) Households(H) Households(H) Households(H) Batter replace Infernance: village Agent free Agent free Stance from Grid Capacity Utal consumption Stance from Grid Stance from Grid Grid Grid Grid Grid Grid Grid Grid					₩		kıı																				\int	Wp	1	ΚII			<u> </u>	L												
Annual consumption Distance from Grid Investment costs (A) Battery replace Operation & maintenance village Agent fee Head office Total Cost of electricity Cost of electricity Distance from Grid Investment costs (A) Distance from Grid Investment costs (A) Distance from Grid Investment costs (A) Battery replace Cost of electricity Annual consumption Distance from Grid Investment costs (A) Battery replace Operation & maintenance village Cost of electricity Annual consumption Distance from Grid Investment costs (A) Battery replace Cost of electricity Annual consumption Distance from Grid Investment costs (A) Battery replace Cost of electricity Annual consumption Distance from Grid Investment costs (A) Connection costs (A) Connection costs (A) Connection cost (Variables		L	400	ᆫ	L									L		L																L												
Annual con Distance Investment Total Cost of electricity Distance Investment Annual cor Annual cor Connec Connec Annual cor Annual cor Annual cor Annual cor Connec Annual cor Annual cor Annual cor Connec Annual cor Annual cor Connec Connec Connec Connec Annual cor Connec				cholds(H)	Capacity	noitdmust	from Grid	costs (A)	ry replace	ce: village	Agent fee	cad office				ouseholds	noinmust	from Grid	costs (A)	tion costs		intenance	проп соя		,		eholds(H)	Capacity	nsumption	from Grid	costs (A)	ry replace	Agent fee	ead office				ouscholds	nsumption	from Grid	costs (A)	ction costs		aintenance	mport cost	•
1 1 1 1 1 1 1 1 1 1			8	l		Vnnual cor	Distance	rvestment	Batte	naintenanc		#	i	electricity	, E	H	Annual cor	Distance	nvestment	Connec		tion & ma	ration or it	otal	electricity	ou	Hous		Annual co.	Distance	nvestment	Batte		H:	otal	electricity	uo	H	Annual con	Distance	nvestment	Connec		ation & ma	eration or ir	
			lectrificati							eration &			[Cost of	3lectrificat							Oper	ower gene		Cost o	Electrificat						eration &				Cost o.	Sectrificat							Oper	ower gene	
			-a SHS E	<u> </u>						ြီ	-	-		\vdash	-b Grid F				_`	A	 7			Н		-a SHS	\dashv	\dashv	+	+	+	6					-b Grid 1	_			\downarrow	_	4	\downarrow	+	

Appendix Table 7.1-3-7 Comparison of Grid Electrification and SHS