

NPV Summary Calculation Sheet

	Pilot Site		Additional Sites		
	Unit List	Discount	Net		
Number of Sites	1				257
Solar Panels & Gnd Mount	\$10,664	24	2,361	10%	\$546,099
Transverter Equipment	\$11,360	3	4,580	50%	\$588,530
Batteries	0	18	\$400	10%	\$1,665,360
IDS Software	2,495	1	\$820	10%	\$189,689
Management, T & L	18,600				\$642,500
Install Assistance	7,000				\$1,028,000
Site Supplies	3,000	1	\$2,700	10%	\$624,510
System Net Cost	53,119		17,361		5,284,688
Ship, Tax, Permit	6,500		\$6,500		1,670,500
System List Cost	\$59,619		\$23,861		\$6,955,188
Solar System Life	20.0	years			20.0 years
Installed System Equivalent kWh Rate	\$0.26	\$/kWh			\$0.14 \$/kWh

Site Details		
Diesel Fuel Cost	\$/Gal	\$3.50
Conversion	L/Gal	3.79
Diesel Hourly Burn Rate	L/hr	2.5
Hourly Fuel Cost	\$/L	\$0.92
Days/month		30.42
Monthly Fuel Cost		\$1,685
Delivery Cost		\$78
Generator Services		\$164
Generator Size		15 kW
Reported Site Gen Op Cost	Monthly	\$1,927.36
	Hourly	\$2.64
Fuel Equivalent kWh Rate	\$/kWh	\$1.73
Cell Tower Load		1172.7
Balance of Plant		352.69
Daily Site Load		1525.4 Watts
Monthly Site Load		1,113.5 kWh

Inverter/Solar System Efficiency	
	97%

Transverter Equipment Prices	
HT2000	\$3,390.00
T13X	\$895.00
HTREM	\$295.00

IDS Software Prices	
Software	\$695.00
Cloud Services & Support	18% Annual

Number of Solar Panel	24	24	24
Number of Transverters	3	771	3
kWh Installed Transverters	6 kW	1542 kW	6
Average Daily Solar Generation	20.86 kWh	5360.2 kWh	20.86
Batteries per Bank	24		3 kW
Battery Quantity	72	4626	18 kWh
Number of Battery Banks	3	1542	6
Voltage/Bank	48	36	36
Battery Cost	\$0	\$1,850,400	\$7,200
Installed Cost per kWh	\$2,858.49	1281.8	\$1,281.83
Installed Cost per Watt	\$0.26	\$0.14	\$0.14

Discount Details		
Units		Discount
0	to 50	10%
51	to 100	20%
101	to 200	35%
201	to up	50%
	Tech	Other
Applied Discount Rate	50%	10%

Battery Details	
Type	AGM
Mfg	Outback
List Price	\$400
AH	400
Voltage	12
kWh	4.8
DoD	30%

Solar Panel Details	
Type	Mono
Mfg	LG
List Price	\$361
A	9.17
V	36
kW	330
Efficiency	19.5%
Avg kWh/panel/day	0.87

	Pilot	Add'l Madagascar Sites
20 Year NPV	\$567,733	\$157,948,755
NPV \$ Savings per kWh produced	\$16,770.35	\$18,784.00
Average Annual Diesel Bill w/o Solar & Battery	\$23,128	\$5,943,967
Average Annual Diesel Bill with Solar & Battery	\$819	\$210,463
Percent of Load Served by Solar/Battery	96.8%	96.8%
Discount Rate	4.00%	4.00%

	kw	6	
	kWh Rate	\$0.26	\$0.14
Diesel Fuel Cost	\$/Gallon	\$3.50	0.87
Conversion	L/G	3.79	24
Diesel Hourly Burn Rate	L/Hr	2.5	19.5%
Hourly Fuel Cost	\$/L	\$0.92	97%
Days/month		30.42	771
Monthly Fuel Cost		\$1,685	4,626
Delivery Cost		\$78	86.4
Generator Services		\$164	1,113.5
Reported Site Gen Op Cost	Monthly	\$1,927.36	
	Hourly	\$2.64	
		Pilot	Madagascar
Solar System Life		20.0	20.0 years
Cell Tower Load		1172.72	Watts
Balance of Plant		352.69	Watts
Site Load		1525.41	Watts
Fuel Equivalent kwh Rate =		\$1.73	\$/kWh
Batteries			
Pilot	Madagascar		
2	12		Voltage
600	400		Ah/Battery
1.2	4.8		kWh/Battery
72	18		# of Batteries
86.4	86.4		kWh Capacity
24	3		Batteries per Bank
48	36		Voltage/Bank
3	6		# of Banks
1800	2400		Ah/Bank
30%	30%		Depth of Discharge
25.92	25.92		kWh Available
Generator			
Demand	15		kw
Daily Capacity	360		kWh
\$/Day	\$623.10		

Avg kwh/panel/day			
# of Panels (array size)			
Panel Efficiency			
Inverter/Solar System Efficiency			
# of Inverters			
Installed Inverter kW			
Installed Battery kWh			
Monthly Site kWh Load			

Pilot	
Solar System Installed Cost	
Panels & Gnd Mount	10,664
Transverter	11,360
Batteries	0
Software	2,495
Management, T & L	18,600
Install Labor	7,000
Site Supplies	3,000
Ship, Tax, Permit	6,500
kW System Total	\$59,619
Installed Cost/W	\$0.26
Installed Cost/kWh	\$2,858.49
Per Site NPV Savings/kWh	\$16,770.35

Madagascar		per Site Cost	Discount
257 Sites			
	546,099	2,361	10%
	588,530	4,580	50%
	1,665,360	400	10%
	105,383	820	50%
	642,500	2,500	
	1,028,000	4,000	
	624,510	2,700	10%
	1,670,500	6,500	
	\$6,870,882	\$23,861	
	\$0.14	\$0.14	
	\$1,281.83	\$1,144.04	
	\$18,784.00		

Average # Hours of Solar generation/day	6.24		
Average daily solar generation/array			
	Pilot Site	Madagascar	One Site
Average daily solar generation	20.86 kWh	5360.20 kWh	20.86 kWh
Average daily load	36.61 kWh	9408.73 kWh	36.61 kWh
Average Monthly Cost (actual today)	\$1,927.36	\$495,330.54	\$1,927.36
Average Monthly with Solar	\$157.93	\$40,587.00	\$157.93
Average Battery operating hours	17.76 hours	17.76 hours	24.00 hours
Battery supplied generation in kWh	25.92 kWh	6661.44 kWh	25.92 kWh
Battery depth of discharge	30.0%	30.0%	30.0%
Solar supplied generation in kWh	9.51 kWh	2445.09 kWh	9.51 kWh
Solar Available to recharge Battery	11.34 kWh	2915.12 kWh	11.34 kWh
Round trip efficiency	94.1%	94.1%	94.1%
Generator supplied kWh	0.00 kWh	0.00 kWh	0.00 kWh
Generator required for recharge	14.58 kWh	3746.32 kWh	14.58 kWh
Generator runtime hours required	0.97 hours	249.75 hours	0.97 hours
Average daily diesel use	2.43 liters	624.39 liters	2.43 liters
Average daily diesel cost	\$2.24	\$576.61	\$2.24
20 Year NPV	\$567,733	\$157,948,755	\$614,587
Average Annual Diesel Bill w/o Solar	\$23,128	\$5,943,967	\$23,128
Average Annual Diesel Bill with Solar	\$819	\$210,463	\$819
Percent of Load Served by Solar/Battery	96.79%	96.79%	96.79%

ROI **Site** **One Pilot Site - 20 year NPV** % of Load served by Solar/Battery: **96.79%**

	NPV	Forecast Fuel & Delivery Price Increase																				
		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Panels & Gnd Mount	\$10,664.00	10,664.00																				
Transverter	\$13,561.92	11,360.00																				
Batteries	\$12,821.01	0.00																				
Site Consulting	\$18,600.00	18,600.00																				
Install Assistance	\$8,618.68	7,000.00																				
Site Supplies	\$3,000.00	3,000.00																				
Software & Support	\$3,351.19	2,495.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00
Ship, Tax, Permit	\$6,500.00	6,500.00																				
Installed Cost	\$71,701.77	59,619.00	63.00	63.00	63.00	63.00	63.00	63.00	63.00	7,043.00	63.00	3,103.00	63.00	63.00	63.00	63.00	63.00	7,691.00	63.00	63.00	63.00	63.00
Op Cost w/o Solar	\$485,693.76	23,128.27	24,053.41	25,015.54	26,016.16	27,056.81	28,139.08	29,264.65	30,435.23	31,652.64	32,918.75	34,235.50	35,604.92	37,029.11	38,510.28	40,050.69	41,652.72	43,318.82	45,051.58	46,853.64	48,727.79	50,676.90
Op Cost w/ Solar	\$28,966.89	1,895.11	1,895.11	1,895.11	1,895.11	1,895.11	1,895.11	1,914.06	1,933.20	1,952.54	1,972.06	1,991.78	2,011.70	2,031.82	2,052.14	2,072.66	2,093.38	2,114.32	2,135.46	2,156.82	2,178.38	2,200.17
Cost	\$100,669	61,514.11	1,958.11	1,958.11	1,958.11	1,958.11	1,958.11	1,977.06	1,996.20	8,995.54	2,035.06	5,094.78	2,074.70	2,094.82	2,115.14	2,135.66	2,156.38	9,805.32	2,198.46	2,219.82	2,241.38	2,263.17
Annual Savings	\$450,445	21,233.16	22,158.29	23,120.43	24,121.05	25,161.70	26,243.97	27,350.58	28,502.03	23,220.10	30,946.68	29,953.71	33,593.22	34,997.29	36,458.14	37,978.03	39,559.33	41,204.51	42,916.12	44,696.82	46,549.40	48,476.73
Cummulative Saving	\$567,733	(\$40,280.95)	(\$20,080.77)	\$1,081.54	\$23,244.48	\$46,448.06	\$70,733.92	\$96,107.44	\$122,613.26	\$136,837.83	\$165,749.45	\$190,608.38	\$222,126.89	\$255,029.37	\$289,372.38	\$325,214.75	\$362,617.70	\$394,016.89	\$434,734.54	\$477,211.55	\$521,519.57	\$567,733.13

ROI **Site 257 Madagascar - 20 year NPV**

% of Load served by Solar/Battery: **96.79%**

	NPV	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Panels & Gnd Mount	546,099	546,099																				
Transverter	1,154,424	588,530										588,530										
Batteries	4,806,387	1,665,360								1,665,360								1,665,360				
Site Management	642,500	642,500																				
Install Assistance	1,444,002	1,028,000										128,500						128,500				
Site Supplies	5624,510.00	624,510.00																				
Software & Support	363,177	105,383	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969	18,969
Ship, Tax, Permit	1,670,500	1,670,500																				
Installed Cost	9,924,993	6,870,882	18,969	18,969	18,969	18,969	18,969	18,969	18,969	1,812,829	18,969	800,249	18,969	18,969	18,969	18,969	18,969	1,812,829	18,969	18,969	18,969	18,969
Op Cost w/o Solar	124,823,297	5,943,967	6,181,725	6,428,994	6,686,154	6,953,600	7,231,744	7,521,014	7,821,854	8,134,729	8,460,118	8,798,522	9,150,463	9,516,482	9,897,141	10,293,027	10,704,748	11,132,938	11,578,255	12,041,386	12,523,041	13,023,963
Op Cost w/ Solar	7,319,863	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044	487,044
Cost	17,031,125	7,357,926	506,013	506,013	506,013	506,013	506,013	506,013	506,013	2,299,873	506,013	1,287,293	506,013	506,013	506,013	506,013	506,013	2,299,873	506,013	506,013	506,013	506,013
Annual Savings	117,717,166	5,456,922	5,694,681	5,941,950	6,199,110	6,466,556	6,744,700	7,033,970	7,334,810	7,647,685	7,973,074	8,311,478	8,663,419	9,029,438	9,410,097	9,805,983	10,217,704	10,645,894	11,091,211	11,554,342	12,035,997	12,536,919
Cumulative Saving	\$157,948,755	(\$1,901,004)	\$3,287,664	\$8,723,602	\$14,416,699	\$20,377,242	\$26,615,929	\$33,143,886	\$39,972,683	\$45,320,495	\$52,787,556	\$59,811,741	\$67,969,148	\$76,492,572	\$85,396,657	\$94,696,627	\$104,408,317	\$112,754,338	\$123,339,537	\$134,387,865	\$145,917,849	\$157,948,755