Costing Estimates for Different Solar Setups

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Notes:

1) ALL COSTS ARE ESTIMATES! Prices change, you will need to ask vendors for current prices.
2) Using Notebook computers instead of desktops significantly reduces the costs to use solar.
3) These costing sheets do not include prices for the computers.
4) Printers are not included.
5) These sheets do not include costs of installation or regular maintenance.
6) Solar panel estimates assume full sun each day with a 5.5 power factor for solar panel power generation. (In other words, a "100W" solar panel produces 100*5.5 = 550Wh each day, the approximate daily average for The Gambia)

All worksheets use this exchange rate for Gambian Dalasis per US dollar: 22

Overview of Estimated Costs for each setup:

	$ US	GMD	Description of Setup
desktops:	$6,807	GMD 149,750	Solar Setup for: 10 Lights (8hrs/day), TV/VCR (2hrs/day), 2 desktop computers (4 hrs/day)
	$13,793	GMD 303,450	Solar Setup for: 10 Lights (8 hrs/day), TV/VCR (2hrs/day), 5 desktop computers (4 hrs/day)
laptops:	$2,880	GMD 63,350	Solar Setup for: 10 Lights (8 hrs/day), TV/VCR (2hrs/day), 2 laptop computers (4 hrs/day)
	$3,975	GMD 87,450	Solar Setup for: 10 Lights (8 hrs/day), TV/VCR (2hrs/day), 5 laptop computers (4 hrs/day)

Solar Costing Estimator

Solar Setup for: 10 Lights (8hrs/day), TV/VCR (2hrs/day), 2 desktop computers (4 hrs/day)

Maximum Estimated Power Needed (per day)

user-changeable rows	item	number	Per-Item Watt Hour (Wh) use each hour	Total Watt hour (Wh) use for all items	Hours Used Per Day	total Watt Hours (Wh) per day
x	Desktop Computer (220V @ 2A = 440W)	2	440	880	4	3520
x	Laptop Computer (avg 75W)	0	75	0	4	0
x	TV (estimated Watts: 80W)	1	80	80	2	160
x	VCR (estimated Watts: 70W)	1	75	75	2	150
x	Lamps (5W Florescent)	10	5	50	8	400
x	Lamps (11W Florescent)	0	11	0	0	0
x	future	0	0	0	0	0
x	future	0	0	0	0	0
x	Overflow / future budgeting	1	100	100	1	100
	TOTAL:	**15**		**1185**		**4330.00** Watt Hours (Wh) Per Day
			Including DC/AC Conversion Loss (15%):			**4979.50** Watt Hours (Wh) Per Day

Total Amps used each hour from a 12V Battery: **414.96 Amp Hours (Ah) used Each Day**

% of Battery useable: **75%** (Gell/Solar Batteries are 75% useable, Lead-Acid are 50% useable)

Total Labeled 12V Battery Amp Hours (Ah) Required: **553.28 Amp Hours** = **6 pieces 12V, 100 Amp-Hour (Ah) Batteries**

Costs:

Exchange Rate US Dollars / Gambian Dalasis: ***22*$ / GMD**

TOTAL ESTIMATED COST: USD $6,807 GMD 149,750

	item	quantity	cost per item (GMD)	CHANGEABLE FIELD Include? *(1=yes, 0=no)*	total cost (GMD)	
Solar Panels						
x	"100W" panels [generally last 5-20 years], In Gambia, average = 550W/day	10	10000	1	100,000	Note: Prices may differ depending on panel sizes, generally bigger panels are cheaper than several smaller ones.
x						
Charge Controller						
x	Estimated Cost for a Good Charge Controller, Prices Vary	1	5000	1	5,000	
x						
Batteries						
x	Gell Batteries [generally last 3-10 years] (Cost / 100 Amp Hours)	6	4000	1	24,000	Note: Reccomended as they will last longer and have a lower total amortized cost/year vs. Lead Acid batteries
x	Lead Acid Batteries [generally last 1-2 years] (Cost / 100 Amp Hours)	6	1800	0	0	
x						
Inverters	***(Note: online prices to ship in America are SIGNIFICANTLY cheaper than the local estimated prices used here)***					
x	H&M "American" 1500W	1	20000	1	20,000	Note: Must support total Watts/hour maximum above
x	H&M "American" 2400W	1	35000	0	0	Note: Must support total Watts/hour maximum above
x						
Chargers (require 220V AC source)						
x	20 Amp Charger (H&M)	1	2500	0	0	
x						
Charging Inverters (require 220V AC source)						
x	MP Trading 500W Inv / 8A Charger	0	3500	0	0	
x	MP Trading 1000W Inv / ?A Charger	0	5400	0	0	
x	MP Trading 1500W Inv / ?A Charger	0	7300	0	0	

Plugs and Wiring						
x	THICK wiring and connectors for batteries	6	100	1	600	Note: assumes 100D/battery
x	1.5mm core Red Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	1.5mm core Black Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	1.5mm core Green Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	APC Power Strips with Surge Protectors	3	600	0	0	
x	Male Plugs	0	25	0	0	
x	1-Socket Female w/ Casing	0	35	0	0	
x	2-Socket Female w/ Casing	0	90	0	0	
x						
Voltage Stabalizers ***(only necessary with connections to AC power source, optional for fully solar DC system)***						
x	EMKAY 500VA	0	450	0	0	
x	1000VA	0	700	0	0	
x	2000VA	0	1500	0	0	
UPS (Uninterruptable Power Supplies) ***(optional but highly reccomended one for each computer)***						
x	APC 500VA	0	4000	0	0	
x						
Miscelaneous						
x	Voltmeter / Multimeter	1	150	1	150	
x						
Installation						
x	Battery Installation	0		0	0	
x	Charger & Inverter Installation	0		0	0	
x	Wiring to each outlet	0		0	0	
x	Plugs, Switches, and Sockets	0		0	0	
Maintenance						
x	Battery Checks (oce every month)					
x	Gell Battery Replacement (once every 3-10 years)					
x	Lead-Acid Battery Acid Replacement (once every 9-12 months)					
x	Lead-Acid Battery Replacement (1-2 years)					

Solar Costing Estimator

Solar Setup for: 10 Lights (8 hrs/day), TV/VCR (2hrs/day), 5 desktop computers (4 hrs/day)

Maximum Estimated Power Needed (per day)

user-changeable rows	item	number	Per-Item Watt Hour (Wh) use each hour	Total Watt hour (Wh) use for all items	Hours Used Per Day	total Watt Hours (Wh) per day
x	Desktop Computer (220V @ 2A = 440W)	5	440	2200	4	8800
x	Laptop Computer (avg 75W)	0	75	0	4	0
x	TV (estimated Watts: 80W)	1	80	80	2	160
x	VCR (estimated Watts: 70W)	1	75	75	2	150
x	Lamps (5W Florescent)	10	5	50	8	400
x	Lamps (11W Florescent)	0	11	0	0	0
x	future	0	0	0	0	0
x	future	0	0	0	0	0
x	Overflow / future budgeting	1	100	100	1	100
	TOTAL:	**18**		**2505**		**9610.00** Watt Hours (Wh) Per Day
			Including DC/AC Conversion Loss (15%):			**11051.50** Watt Hours (Wh) Per Day

Total Amps used each hour from a 12V Battery: **920.96 Amp Hours (Ah) used Each Day**

% of Battery useable: **75%** (Gell/Solar Batteries are 75% useable, Lead-Acid are 50% useable)

Total Labeled 12V Battery Amp Hours (Ah) Required: **1227.9 Amp 4 Hours** = **13 pieces 12V, 100 Amp-Hour (Ah) Batteries**

Costs:

Exchange Rate US Dollars / Gambian Dalasis: ***22*$ / GMD**

TOTAL ESTIMATED COST: USD $13,793 GMD 303,450

	item	quantity	cost per item (GMD)	CHANGEABLE FIELD Include? *(1=yes, 0=no)*	total cost (GMD)	
Solar Panels						
x	"100W" panels [generally last 5-20 years], In Gambia, average = 550W/day	21	10000	1	210,000	Note: Prices may differ depending on panel sizes, generally bigger panels are cheaper than several smaller ones.
x						
Charge Controller						
x	Estimated Cost for a Good Charge Controller, Prices Vary	1	5000	1	5,000	
x						
Batteries						
x	Gell Batteries [generally last 3-10 years] (Cost / 100 Amp Hours)	13	4000	1	52,000	Note: Reccomended as they will last longer and have a lower total amortized cost/year vs. Lead Acid batteries
x	Lead Acid Batteries [generally last 1-2 years] (Cost / 100 Amp Hours)	13	1800	0	0	
x						
Inverters ***(Note: online prices to ship in America are SIGNIFICANTLY cheaper than the local estimated prices used here)***						
x	H&M "American" 1500W	1	20000	0	0	Note: Must support total Watts/hour maximum above
x	H&M "American" 2400W	1	35000	1	35,000	Note: Must support total Watts/hour maximum above
x						
Chargers (require 220V AC source)						
x	20 Amp Charger (H&M)	1	2500	0	0	
x						
Charging Inverters (require 220V AC source)						
x	MP Trading 500W Inv / 8A Charger	0	3500	0	0	
x	MP Trading 1000W Inv / ?A Charger	0	5400	0	0	
x	MP Trading 1500W Inv / ?A Charger	0	7300	0	0	

Plugs and Wiring						
x	THICK wiring and connectors for batteries	13	100	1	1,300	Note: assumes 100D/battery
x	1.5mm core Red Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	1.5mm core Black Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	1.5mm core Green Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	APC Power Strips with Surge Protectors	3	600	0	0	
x	Male Plugs	0	25	0	0	
x	1-Socket Female w/ Casing	0	35	0	0	
x	2-Socket Female w/ Casing	0	90	0	0	
x						
Voltage Stabalizers ***(only necessary with connections to AC power source, optional for fully solar DC system)***						
x	EMKAY 500VA	0	450	0	0	
x	1000VA	0	700	0	0	
x	2000VA	0	1500	0	0	
UPS (Uninterruptable Power Supplies) ***(optional but highly reccomended one for each computer)***						
x	APC 500VA	0	4000	0	0	
x						
Miscelaneous						
x	Voltmeter / Multimeter	1	150	1	150	
x						
Installation						
x	Battery Installation	0		0	0	
x	Charger & Inverter Installation	0		0	0	
x	Wiring to each outlet	0		0	0	
x	Plugs, Switches, and Sockets	0		0	0	
Maintenance						
x	Battery Checks (oce every month)					
x	Gell Battery Replacement (once every 3-10 years)					
x	Lead-Acid Battery Acid Replacement (once every 9-12 months)					
x	Lead-Acid Battery Replacement (1-2 years)					

Solar Costing Estimator

Solar Setup for: 10 Lights (8 hrs/day), TV/VCR (2hrs/day), 2 laptop computers (4 hrs/day)

Maximum Estimated Power Needed (per day)

user-changeable rows	item	number	Per-Item Watt Hour (Wh) use each hour	Total Watt hour (Wh) use for all items	Hours Used Per Day	total Watt Hours (Wh) per day
x	Desktop Computer (220V @ 2A = 440W)	0	440	0	4	0
x	Laptop Computer (avg 75W)	2	75	150	4	600
x	TV (estimated Watts: 80W)	1	80	80	2	160
x	VCR (estimated Watts: 70W)	1	75	75	2	150
x	Lamps (5W Florescent)	10	5	50	8	400
x	Lamps (11W Florescent)	0	11	0	0	0
x	future	0	0	0	0	0
x	future	0	0	0	0	0
x	Overflow / future budgeting	1	100	100	1	100
	TOTAL:	**15**		**455**		**1410.00** Watt Hours (Wh) Per Day
			Including DC/AC Conversion Loss (15%):			**1621.50** Watt Hours (Wh) Per Day

Total Amps used each hour from a 12V Battery: **135.13** Amp Hours (Ah) used Each Day

% of Battery useable: **75%** (Gell/Solar Batteries are 75% useable, Lead-Acid are 50% useable)

Total Labeled 12V Battery Amp Hours (Ah) Required: **180.17 Amp Hours** = **2 pieces 12V, 100 Amp-Hour (Ah) Batteries**

Costs:

Exchange Rate US Dollars / Gambian Dalasis: ***22*$ / GMD**

TOTAL ESTIMATED COST: USD $2,880 GMD 63,350

	item	quantity	cost per item (GMD)	CHANGEABLE FIELD Include? *(1=yes, 0=no)*	total cost (GMD)	
Solar Panels						
x	"100W" panels [generally last 5-20 years], In Gambia, average = 550W/day	3	10000	1	30,000	Note: Prices may differ depending on panel sizes, generally bigger panels are cheaper than several smaller ones.
x						
Charge Controller						
x	Estimated Cost for a Good Charge Controller, Prices Vary	1	5000	1	5,000	
x						
Batteries						
x	Gell Batteries [generally last 3-10 years] (Cost / 100 Amp Hours)	2	4000	1	8,000	Note: Reccomended as they will last longer and have a lower total amortized cost/year vs. Lead Acid batteries
x	Lead Acid Batteries [generally last 1-2 years] (Cost / 100 Amp Hours)	2	1800	0	0	
x						
Inverters ***(Note: online prices to ship in America are SIGNIFICANTLY cheaper than the local estimated prices used here)***						
x	H&M "American" 1500W	1	20000	1	20,000	Note: Must support total Watts/hour maximum above
x	H&M "American" 2400W	1	35000	0	0	Note: Must support total Watts/hour maximum above
x						
Chargers (require 220V AC source)						
x	20 Amp Charger (H&M)	1	2500	0	0	
x						
Charging Inverters (require 220V AC source)						
x	MP Trading 500W Inv / 8A Charger	0	3500	0	0	
x	MP Trading 1000W Inv / ?A Charger	0	5400	0	0	
x	MP Trading 1500W Inv / ?A Charger	0	7300	0	0	

Plugs and Wiring						
x	THICK wiring and connectors for batteries	2	100	1	200	Note: assumes 100D/battery
x	1.5mm core Red Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	1.5mm core Black Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	1.5mm core Green Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	APC Power Strips with Surge Protectors	3	600	0	0	
x	Male Plugs	0	25	0	0	
x	1-Socket Female w/ Casing	0	35	0	0	
x	2-Socket Female w/ Casing	0	90	0	0	
x						
Voltage Stabalizers ***(only necessary with connections to AC power source, optional for fully solar DC system)***						
x	EMKAY 500VA	0	450	0	0	
x	1000VA	0	700	0	0	
x	2000VA	0	1500	0	0	
UPS (Uninterruptable Power Supplies) ***(optional but highly reccomended one for each computer)***						
x	APC 500VA	0	4000	0	0	
x						
Miscelaneous						
x	Voltmeter / Multimeter	1	150	1	150	
x						
Installation						
x	Battery Installation	0		0	0	
x	Charger & Inverter Installation	0		0	0	
x	Wiring to each outlet	0		0	0	
x	Plugs, Switches, and Sockets	0		0	0	
Maintenance						
x	Battery Checks (oce every month)					
x	Gell Battery Replacement (once every 3-10 years)					
x	Lead-Acid Battery Acid Replacement (once every 9-12 months)					
x	Lead-Acid Battery Replacement (1-2 years)					

Solar Costing Estimator

Solar Setup for: 10 Lights (8 hrs/day), TV/VCR (2hrs/day), 5 laptop computers (4 hrs/day)

Maximum Estimated Power Needed (per day)

user-changeable rows	item	number	Per-Item Watt Hour (Wh) use each hour	Total Watt hour (Wh) use for all items	Hours Used Per Day	total Watt Hours (Wh) per day
x	Desktop Computer (220V @ 2A = 440W)	0	440	0	4	0
x	Laptop Computer (avg 75W)	5	75	375	4	1500
x	TV (estimated Watts: 80W)	1	80	80	2	160
x	VCR (estimated Watts: 70W)	1	75	75	2	150
x	Lamps (5W Florescent)	10	5	50	8	400
x	Lamps (11W Florescent)	0	11	0	0	0
x	future	0	0	0	0	0
x	future	0	0	0	0	0
x	Overflow / future budgeting	1	100	100	1	100
	TOTAL:	**18**		**680**		**2310.00** Watt Hours (Wh) Per Day
				Including DC/AC Conversion Loss (15%):		**2656.50** Watt Hours (Wh) Per Day

Total Amps used each hour from a 12V Battery: **221.38** Amp Hours (Ah) used Each Day

% of Battery useable: **75%** (Gell/Solar Batteries are 75% useable, Lead-Acid are 50% useable)

Total Labeled 12V Battery Amp Hours (Ah) Required: **295.17** Amp Hours = **3** pieces 12V, 100 Amp-Hour (Ah) Batteries

Costs:

Exchange Rate US Dollars / Gambian Dalasis: ***22*$ / GMD**

TOTAL ESTIMATED COST: USD $3,975 GMD 87,450

	item	quantity	cost per item (GMD)	CHANGEABLE FIELD Include? *(1=yes, 0=no)*	total cost (GMD)	
Solar Panels						
x	"100W" panels [generally last 5-20 years], In Gambia, average = 550W/day	5	10000	1	50,000	Note: Prices may differ depending on panel sizes, generally bigger panels are cheaper than several smaller ones.
x						
Charge Controller						
x	Estimated Cost for a Good Charge Controller, Prices Vary	1	5000	1	5,000	
x						
Batteries						
x	Gell Batteries [generally last 3-10 years] (Cost / 100 Amp Hours)	3	4000	1	12,000	Note: Reccomended as they will last longer and have a lower total amortized cost/year vs. Lead Acid batteries
x	Lead Acid Batteries [generally last 1-2 years] (Cost / 100 Amp Hours)	3	1800	0	0	
x						
Inverters ***(Note: online prices to ship in America are SIGNIFICANTLY cheaper than the local estimated prices used here)***						
x	H&M "American" 1500W	1	20000	1	20,000	Note: Must support total Watts/hour maximum above
x	H&M "American" 2400W	1	35000	0	0	Note: Must support total Watts/hour maximum above
x						
Chargers (require 220V AC source)						
x	20 Amp Charger (H&M)	1	2500	0	0	
x						
Charging Inverters (require 220V AC source)						
x	MP Trading 500W Inv / 8A Charger	0	3500	0	0	
x	MP Trading 1000W Inv / ?A Charger	0	5400	0	0	
x	MP Trading 1500W Inv / ?A Charger	0	7300	0	0	

Plugs and Wiring						
x	THICK wiring and connectors for batteries	3	100	1	300	Note: assumes 100D/battery
x	1.5mm core Red Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	1.5mm core Black Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	1.5mm core Green Wire Spools (100yards)	2	550	0	0	Note: used to connect from Charge Controller to devices
x	APC Power Strips with Surge Protectors	3	600	0	0	
x	Male Plugs	0	25	0	0	
x	1-Socket Female w/ Casing	0	35	0	0	
x	2-Socket Female w/ Casing	0	90	0	0	
x						
Voltage Stabalizers ***(only necessary with connections to AC power source, optional for fully solar DC system)***						
x	EMKAY 500VA	0	450	0	0	
x	1000VA	0	700	0	0	
x	2000VA	0	1500	0	0	
UPS (Uninterruptable Power Supplies) ***(optional but highly reccomended one for each computer)***						
x	APC 500VA	0	4000	0	0	
x						
Miscelaneous						
x	Voltmeter / Multimeter	1	150	1	150	
x						
Installation						
x	Battery Installation	0		0	0	
x	Charger & Inverter Installation	0		0	0	
x	Wiring to each outlet	0		0	0	
x	Plugs, Switches, and Sockets	0		0	0	
Maintenance						
x	Battery Checks (oce every month)					
x	Gell Battery Replacement (once every 3-10 years)					
x	Lead-Acid Battery Acid Replacement (once every 9-12 months)					
x	Lead-Acid Battery Replacement (1-2 years)					