

**MAKING EXPERIENCE
VISIBLE**



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SECTION D

KNX SOLAR ENERGY SYSTEM INSTALLATION.

Solar Energy system is one of the evolving element of our company.

A solar Energy system captures and stores energy generated by solar panels. It can be used during the night, on cloudy days or during light out.

Generally, a solar Energy system consist of a battery bank, a charge controller, an inverter, Energy management system (EMS).

Solar Energy system reduces reliance on utility companies and acts as a backup during blackouts.

Solar Energy system lowers your monthly utility bill by allowing you to use stored solar energy during peak evening hours when grid rates are highest.

SOLAR PANELS.

These are photovoltaic (PV) devices that capture direct sunlight and convert it into electrical energy.



The power output of solar panels is measures in watts (W) while the solar system sizes are typically measured in kilowatts.



Installing solar panels on a residential building is a highly effective way to reduce utility bills and lower your carbon footprint.

Solar panels reduces your carbon footprint by replacing fossil fuel electricity with clean renewable energy. When a building generates its own solar power, it stops drawing electricity from local power grids that rely on burning coal, oil or natural gas.



SOLAR INVERTER.

This is the central brain of the solar system. It converts the DC electricity generated by the solar panels into AC electricity needed to power your household appliances and interfaces with the electrical grid.

Most solar panels last for 25+ years.



A solar energy system consist of more than just panels on your roof. There are multiple components that work together to power your home.

It serves as the brain of the solar system. It's primary/core function is to convert DC electricity to AC electricity which is required to run your household appliances.

It also matches the public utility grid's electricity, (synchronizes), manages battery storage and tracks overall system performance.



There are three main types of solar energy systems.

- (a) grid
- (b) off-grid
- (c) Hybrid.

Choosing the right inverter depends mainly on these types of solar energy system. It also depends on your budget and roof layout.

Hybrid solar energy system is widely used around the world that includes Ghana, Nigeria and Togo. That is why our emphasis are about hybrid inverters.

Hybrid inverters are modern and versatile units that handles both solar panels and battery storage simultaneously.

It converts solar energy for immediate use, sends excess to the battery and can pull from the grid when needed.

We have experienced professionals who will install it for you without any mistake. This is because proper installation and wiring ensure the safety, longevity and efficiency of your solar system.

An example is a WHC solar HVM-II 5.5KW hybrid solar inverter. It has a built-in MPPT charge controller.

The inverter is rated 5.5KW and features a detachable dust cover for harsh environments.

It supports PV inputs up to 500VDC max. It also features battery equalization to optimize performance, and can function without a battery.

SOLAR SYSTEM BATTERY STORAGE

It captures the electricity generated by your solar panels during the day and stores it.

This stored energy is then discharged to power your home at night, during cloudy weather or during power outages, maximizing your energy independence and keeping your home bright and showing when your neighbors are in darkness or suffering from noise pollution generated from power plants.



You do not have to worry about manually turning off or on anything to prevent damaging the battery because, there is Energy Management System (EMS).

EMS is a smart software that monitors your energy consumption, solar production and Battery levels to optimize when to charge or discharge.

There are many advantages of using solar energy system.

(I) Electricity bill savings

(II) Clean and renewable energy source.

(III) Low maintenance

(IV) It increases home value

(V) It increases energy independence

Research have shown that on average, solar energy system pay for themselves after 10 years, making them a worthwhile investment for many home owners.

In some cases, having solar energy system could completely wipe out your monthly bills depending on your utility.

WANT TO INSTALL SOLAR ENERGY SYSTEM?

TO GET STARTED.

(1) Call +233593476463

(2) Our team will arrive at your site to inspect your site and verify the power ratings of the appliances you use / will use in order to know the amount of KW/volt solar energy system your house would require.

(3) Our team will arrive again after inspection but this time with the solar panels and other accessories to begin installations.

But before the installation starts, you are expected to pay half (1/2) of the total estimated money for the solar energy system which includes the installation fee.

(4) After installations are complete and everything is functioning properly: You are expected to pay the remaining cost before our team leaves your site.

We do not take full payment until we complete the installations because we have confidence in our product and our installers. And we do not welcome the act of our clients holding unto our money after installation is complete.

It is also to be noted that labor cost vary widely based on your location and complexity of your property's electrical layout.

SOLAR ENERGY SYSTEM INSTALLATIONS SAMPLE ESTEMATE.

(A) 500W/384Wh solar Energy Storage system.

- **Battery:** 12.8V 30 Ah (Lifepo4 battery)
- 300W modified wave inverter.



500W/384Wh Solar Energy Storage System

Battery: **12.8V 30Ah** (Lifepo4 battery)

300W modified wave inverter

Function

LCD screen

12V 5A DC Output port*4

5V 3A USB port*4

220V 300W AC port*2

18V solar charging/ AC charging port *1

Function.

1. it charges and recharges your Smartphones like 25 to 30 times.
2. It also charges your Laptop (approx. 60Wh per charge).
3. It carries LED Bulbs (10W) for about 25 to 30 hours.
4. It carries small DC Fan (30W) for about 10 to 11 hours.
5. It carries small TV (40W) for about 7 to 8 hours.

Limitations.

Because the inverter connected to this battery is typically 300W to 500W, you cannot plug in devices that exceeds this limit eg. Blender's microwaves or hair dryers.

It cannot run heating or cooling appliances like air conditioners, refrigerators or kettles as they consume thousands of watts and would drain the 384Wh battery in minutes.

This type of solar storage system does not need time to install so you can order it from us and pay us when we arrive at your destination (I.e. after you have seen, touch and confirm the product).



- **Price:** GH¢ 3200.00
- **New Price:** GH¢ 2,900.00

(B) 550W/640Wh Solar Energy Storage system.

- It consist of 500W pure sine wave inverter and battery of 12.8V 50 Ah (Lifepo4 battery)



550W/640Wh Solar Energy Storage System

Battery: 12.8V 50Ah (Lifepo4 battery)

500W pure sine wave inverter

Function

LCD screen

12V 5A DC Output port*4

5V 3A USB port*4

220V 300W AC port*1

18V solar charging/ AC charging port *1

Function.

Unlike the 500W/380Wh system, this 550W/640Wh stores significantly more energy. this larger battery reservoir allows it to power the devices the 500W/380Wh can power for nearly 70% longer on a single charge.



The 640Wh system is much better suited for overnight use. It can safely run small, constant loads like a Wi-Fi router, standing fan and security lights all night without running out of power before sunrise.

- **Price:** GH¢ 3,800.00
- **New Price:** GH¢ 3,650.00

(C) 1200W/1008Wh Solar Energy Storage System

- **Battery:** 22.4V 45Ah (Lifepo4 battery)
1200W Pure Sine Wave Inverter



1200W/1008Wh Solar Energy Storage System

Battery: **22.4V 45Ah** (LiFePO4 battery)

1200W pure sine wave inverter

Function

3W LED light*1

LCD screen

24V DC Output port*2

18W USB-A port*3

65W USB-C port*1

220V 1000W AC port*2

XT60 18~30V max 15A solar charging*1

12~30V max 15A charging adapter port *1

Function

A 1200W solar storage system can generate about 4.6 - 4.8 kWh of energy per day. It is generally capable of running multiple appliances simultaneously.

Appliances like:

5-10 LED bulbs, a TV, a Wi-Fi router, 2-3 standing fans, and charging of multiple laptops and phones; small blenders and small fridge.

NB: It is usually not powerful enough to run heavy-duty appliances like large air conditioners, etc.



- **Price:** GH¢ 8,700.00
- **New price:** GH¢ 8,200.00

NOW for bigger house like 3 to 5 bedroom duplex in order for your solar energy system to carry all your appliances including your heavy-duty appliances 20-30 kWh of solar power is needed.

30 kWh Solar Energy System Installation

NOTE: A 30 kWh system is designed for high-energy usage. It can comfortably run energy-heavy appliances such as multiple heavy-duty air conditioners, deep freezers, water pumps, refrigerators, and high-draw office equipment simultaneously.

Cost Breakdown (Accessories) Wholesale Price

1. Solar panel unit price — GH¢ 1,850
2. 11 kWh solar inverter unit price — GH¢ 16,000
3. 15 kWh battery unit price — GH¢ 38,000
4. AC Cable unit price — GH¢ 2,800
5. DC Cable unit price — GH¢ 2,500
6. Changeover — GH¢ 1,300
7. Rails — GH¢ 600
8. AC Breaker — GH¢ 200
9. AC Breaker — GH¢ 180
10. Trunking — GH¢ 170
11. Breaker box — GH¢ 175
12. Surge — GH¢ 205
13. Clamps — GH¢ 32
14. Pipe — GH¢ 14
15. VA protector — GH¢ 238

Sample Estimate for 30 kWh / 11 kW Solar Energy System Installation

	SPECIFICATION	QTY	UNIT PRICE (GH¢)	AMOUNT (GH¢)
01	15 kWh battery	2	38,000.00	76,000.00
02	11 kWh solar inverter	1	16,000.00	16,000.00
03	Solar panel	20	1,850.00	37,000.00
04	AC cable	1	2,800.00	2,800.00
05	DC Cable	2	2,500.00	5,000.00
06	Change over	1	1,300.00	1,300.00
07	AC Breaker	2	180.00	360.00
08	DC Breaker	2	200.00	400.00
09	VA protector	2	238.00	476.00
10	Surge	2	205.00	410.00
11	Breaker box	2	175.00	350.00
12	Pipes	20	14.00	280.00
13	Trunking	1	170.00	170.00
14	Clamps	40	32.00	1,280.00
15	Rails	11	600.00	6,600.00
16	Installation Fee			8,500.00
17	TOTAL			156,926.00

NB: The power rating of your house must not be 30 kWh. It can be 5 kWh, 10-15 kWh or more than 30 kWh.

Mainly the building that carry the 30 kWh or more are commercial building with a lot of heavy-duty equipment.

Your 3-5 bedroom apartment or house can be 12 kWh or less which means the cost will be way cheaper.

Experiment:

A 3-5 bedroom duplex consumes GH¢ 250.00 every week. In 15 years the total electricity bills would be GH¢ 180,000.00.

But the solar energy system that can power the house constantly for 15-25 years cost GH¢ 160,000.00.

That is GH¢ 20,000 electricity less spent and over 5 to 10 years in addition.