



## APPLICATION SOLUTIONS FOR PHOTOVOLTAIC POWER GENERATION SYSTEMS



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Efficient

Green

Energy Saving

# ABOUT US

Sunrise New Energy Technology Co., Ltd. (hereafter "SUNRISE"), incorporated in Kano State, Nigeria, is dedicated to delivering all-encompassing one-stop solar solutions for both residential and commercial & industrial (C&I) sectors across Nigeria.

Its parent company, Shandong Longguang Tianxu Solar Energy Co., Ltd. (abbreviated as "Tanso"), is a global leader in advanced solar solutions. Tanso, with its advanced technologies and rich experience, paves the way for SUNRISE to play a significant role in the Nigerian solar energy market.

The company's core product portfolio encompasses solar photovoltaic systems and solar thermal products. Our offerings include grid-tied solar systems, hybrid solar systems, solar water heating systems, solar water pumping systems, solar irrigation systems, and more. These solutions integrate our proprietary products alongside those from other leading Chinese brands, guaranteeing comprehensive support for all kinds of power needs and contributing significantly to carbon footprint mitigation.



## Company Qualification

- ▶ National Green Factory
- ▶ National-level "Little Giant" Enterprise
- ▶ National High-tech Enterprise
- ▶ Single Product Champion in Manufacturing
- ▶ Industry of Shandong Province
- ▶ Quality-leading Brand in the National Solar Photothermal Industry
- ▶ Provincial Enterprise with "Abiding by Contracts and Valuing Credit"
- ▶ Provincial Enterprise Technology Center of Shandong
- ▶ Well-known Brand in Shandong
- ▶ High-quality Brand in Shandong
- ▶ Innovative Small and Medium-sized Enterprise



# RESIDENTIAL ENERGY STORAGE SYSTEM

The household photovoltaic energy storage system, a novel energy solution that integrates photovoltaic power generation and energy storage technology, is tailor-made for household users and is playing an ever more crucial role in modern household energy management.

This system primarily consists of solar photovoltaic panels, photovoltaic inverters, energy storage batteries, battery management systems (BMS), and energy management systems (EMS). Solar photovoltaic panels take on the responsibility of converting solar energy into direct current. Photovoltaic inverters then transform direct current into alternating current for the use of household appliances or for feeding back to the power grid. When the photovoltaic power generation exceeds the immediate electricity consumption of the household, the energy storage battery stores the surplus electricity under the precise control of the battery management system. The stored electricity can be released when the photovoltaic panel generates insufficient power, for instance, at night or on cloudy days. After being converted by the inverter, it continues to supply power to the household. The energy management system intelligently optimizes the operating strategy of the entire system based on factors such as real-time light intensity, household electricity load, and electricity price fluctuations to achieve maximum efficient utilization of energy and economic benefits.

## Functional Features

1. Significantly enhance household utilization of renewable energy, reduce dependence on traditional power grids, achieve a certain degree of energy self-sufficiency and lower electricity costs. Particularly in regions with substantial peak-valley price differentials, substantial savings can be achieved.
2. In the event of power outages, it serves as an emergency power source for key household appliances, ensuring basic needs and safety and strengthening the family's ability to respond to power crises.
3. Leverage solar energy for clean power generation and storage, reducing greenhouse gas emissions and facilitating household energy conservation and emission reduction. It has a positive impact on environmental protection and addressing climate change.
4. With advanced technology, users can remotely monitor the system via mobile applications or computer software, including power generation capacity, battery power level and household electricity load. They can also flexibly set operating modes and charging/discharging strategies for intelligent household energy management.



# Residential Energy Storage System

## ENERGY STORAGE PRODUCTS LIST

### Energy Storage Battery



### All-in-one Energy Storage Battery System

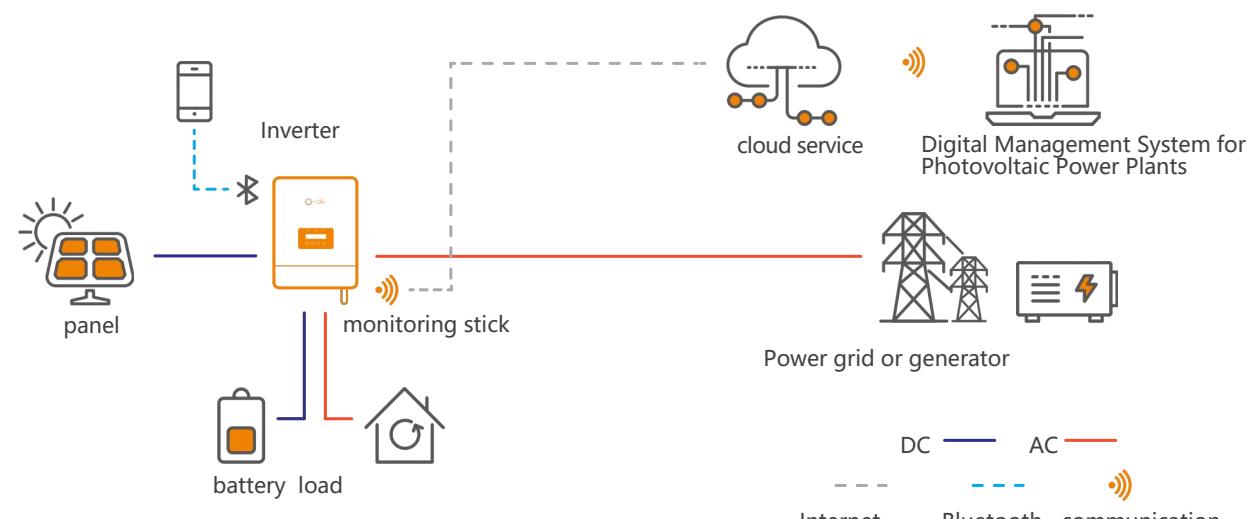


### Inverter

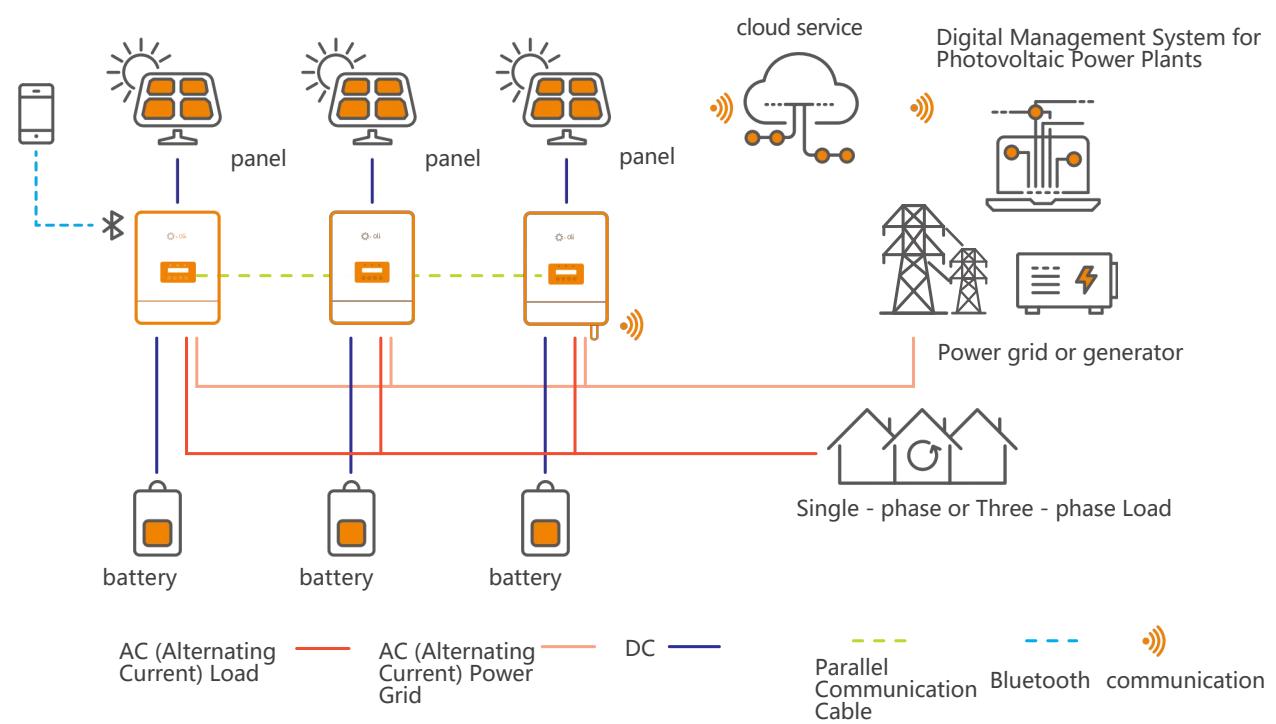


SUNRISE Energy Storage System is specifically designed for areas without grid connection or with frequent power outages. It can meet a variety of application scenarios and enables modular combined configuration of the system as required. Our inverters can be paralleled in multiple units to form a three - phase or single - phase parallel operating system with a maximum capacity of 30kW. They feature an exquisite appearance, compact structure, and are easy to install. They are highly suitable for small - scale industrial and commercial or residential energy storage projects.

#### Off - grid Energy Storage Photovoltaic System Solution - Single Unit



#### Off - grid Energy Storage Photovoltaic System Solution - Multi - unit Parallel Connection





## Residential Energy Storage System- Case Study



- **Retail Store, Kano State, Nigeria**
- **16 kWp PV+8kW/15kWh**
- **Average Daily PV Power yield: 90 kwh**



- **Kindergarten,Dushanbe, Tajikistan**
- **5 kWp PV+5kW/19.2kwh**
- **Average Daily PV Power Yield: 20 kwh**



- **Hotel,Tashkent,Uzbekistan**
- **20 kW Grid-tied PV Project + 5 kW10 kWh Energy Storage System**
- **Average Daily PV Power Yield: 125 kwh**

# C&I ENERGY STORAGE SYSTEM

Energy storage solutions are not limited to residential applications. Commercial and industrial sectors also benefit from the integration of energy storage systems into their operations. Whether it's reducing demand charges, increasing grid resilience, or supporting renewable energy adoption, commercial and industrial energy storage has the potential to revolutionize the way businesses manage their energy consumption.

SUNRISE provides one-stop solutions that are customized to fit your company's unique requirements for commercial and industrial storage systems with maximum performance and efficiency.

## Key Features

- Renewable Integration: Utilizes solar and other renewable sources, reducing reliance on traditional fossil fuels.
- Energy Storage: Equipped with high-capacity batteries, ensuring a stable power supply even during periods of low sunlight or at night.
- Modular Design: Scalable system architecture that can be customized to meet specific energy needs, from small communities to large industrial sites.
- Remote Monitoring and Control: Advanced energy management software allows for real-time monitoring and remote control, ensuring operational efficiency and ease of maintenance.
- Sustainable and Reliable: Providing continuous, eco-friendly energy.



Logistics Park



Oil Field



Residential Housing



Areas Without Electricity



School



Shopping Mall



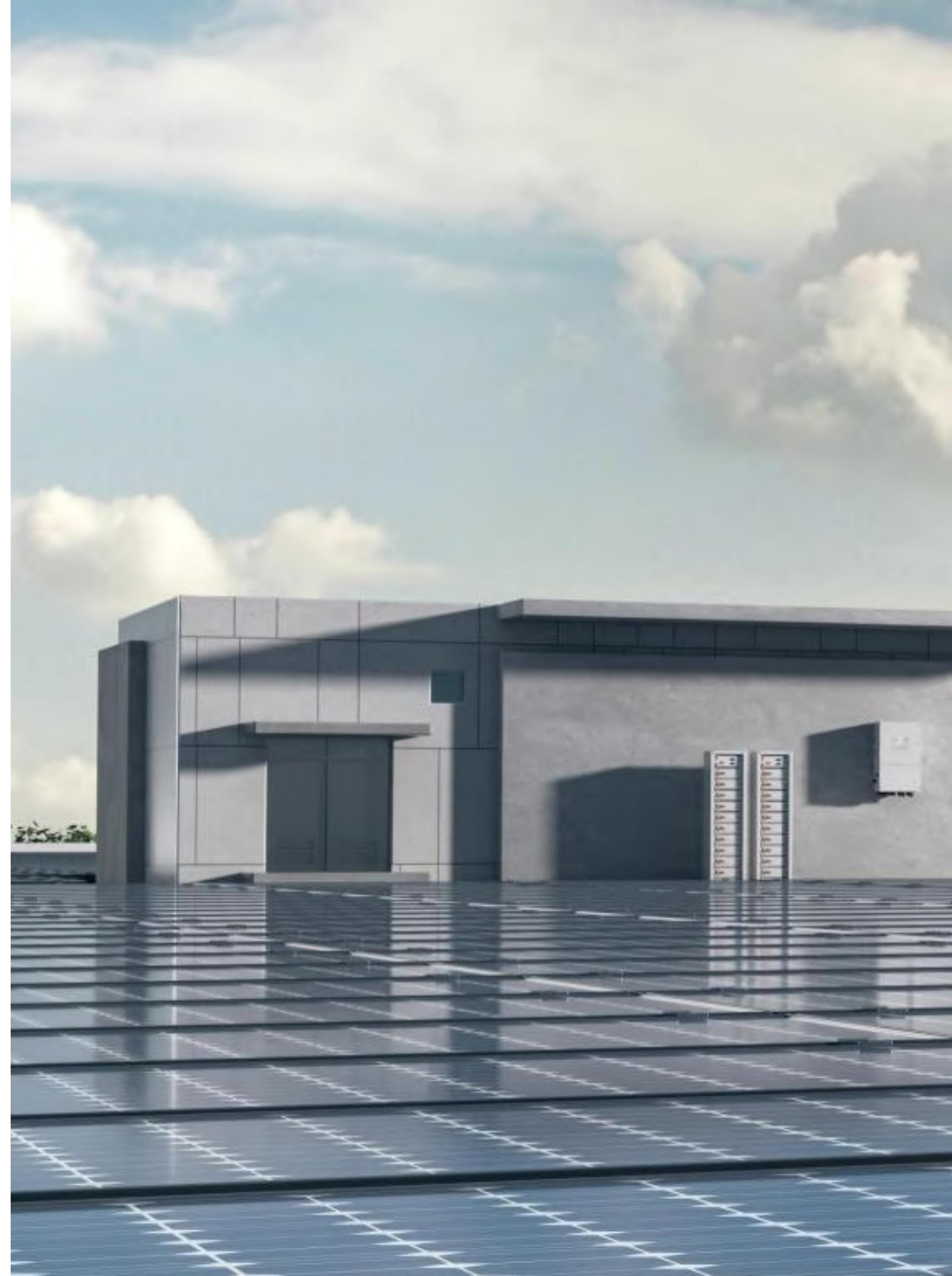
Bank Building



Port

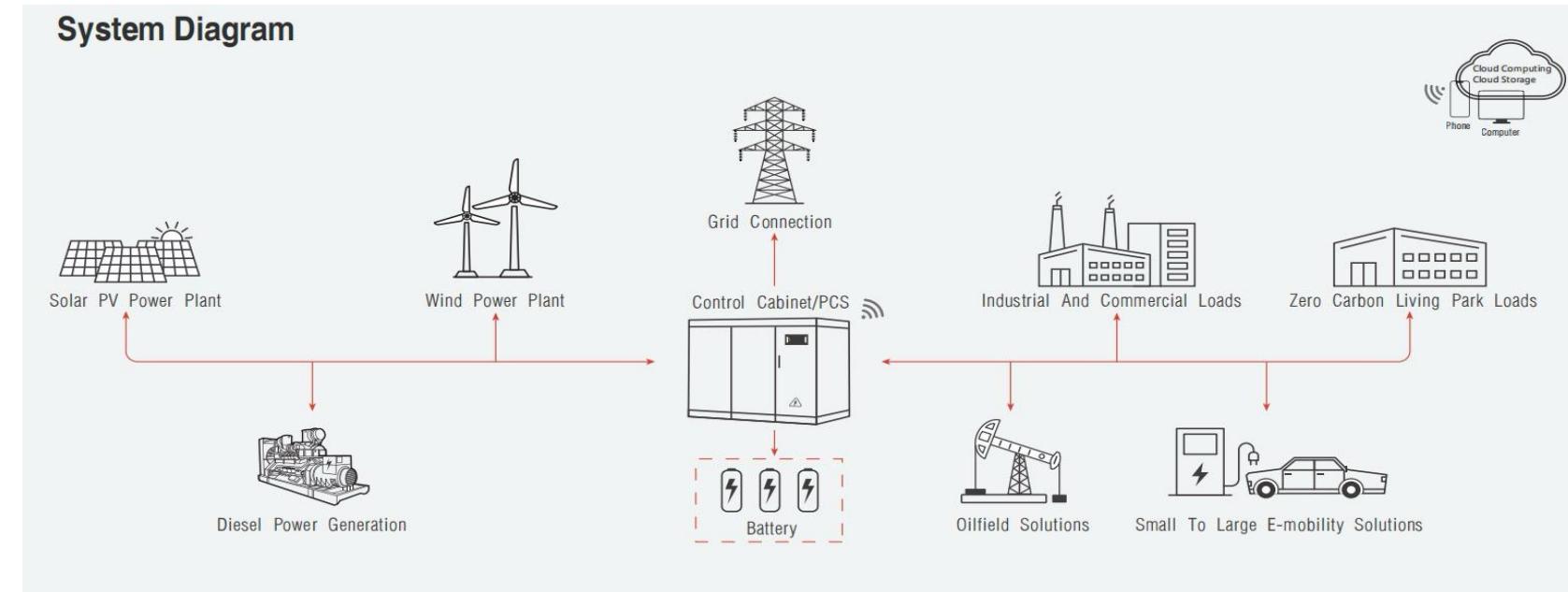


Bus Stop



## PV+ Energy Storage System+ Diesel Generator Solution

- Maximize the utilization of clean energy
- Minimize the operational frequency of diesel generators to mitigate environmental pollution
- Ensure a consistent 24/7 power supply for primary loads



- **City Square, Democratic Republic of the Congo**
- 64.96 kWp PV+60 kW/110 kWh All in one Hybrid Inverters/BESS solution
- This 60 kW/110 kW energy storage cabinet consists of two sets of hybrid inverters (with MPPT and grid - on/off switching functions), one 2000VA/1600W UPS unit, seven 76.8V 206Ah battery packs, and one high - voltage box.



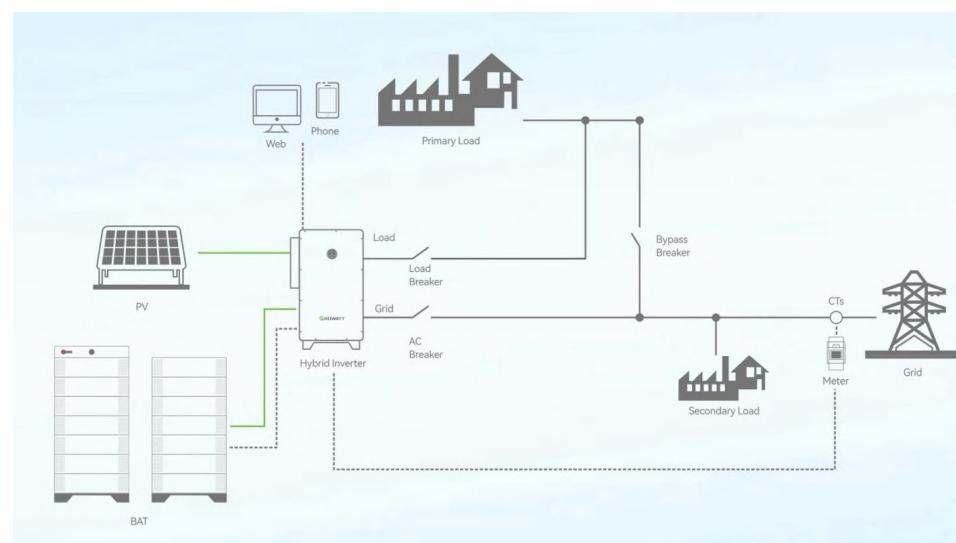
- Administrative Building, Democratic Republic of the Congo
- 130.5 kWp+ 150 kW/174 kWh All in one Hybrid inverters/BESS Soution
- This energy storage cabinet consists of two sets of 100 kW PCS, one set of 120 kW MPPT module, one set of EMS, eleven 76.8 V / 206 A battery packs, and one high-voltage box.



# C& I Energy Storage System Solution

## DC Coupling Solution

- Maximizer self-consumption
- Multiple work modes for smart energy management
- Support backup power function



**Shandong Zhucheng 500KW/1000KWH Energy Storage System**

4 sets of 600 kW liquid - cooled ultra - fast chargers and 18 sets of 180 kW fast chargers

I

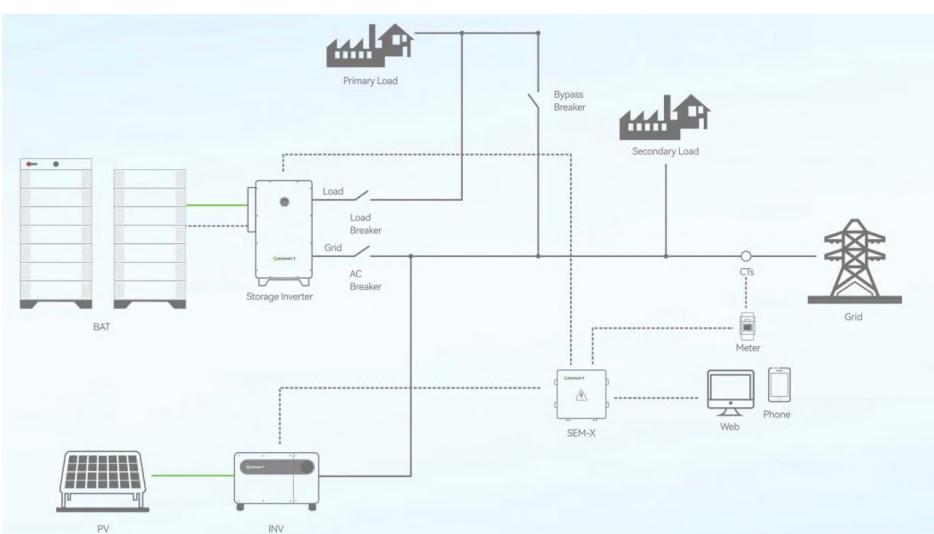


**Shandong Zhucheng 375KW/750KWH Energy Storage System**

II

## AC Coupling Solution

- Integrated into existing solar system
- Enhance the solar self-consumption
- Emergency backup power



**Shandong Weifang Packaging Company 100KW/215KWh Energy Storage Project**

III



Peak Shaving



Demand Charge Management



Grid Resilience & Backup Power



Renewable Integration



Customized Solutions

# Grid-Tied Solar System

An on grid solar system, also known as a grid-tied solar system, is the most widely deployed form of rooftop solar across the world. These systems do not need any batteries and are connected to the utility grid power.

It is best suited for customers with stable grid power and minimal power cuts. Other than homes, even educational institutions, industrial units, commercial establishments use these systems as their primary source of power.

A solar on grid system is designed to first allow solar energy to be consumed by the customer. Beyond this, if the customer needs any excess power, it is drawn from the grid. If the customer's energy requirement is lower than the power generated from the solar system, excess solar units are exported to the grid. This is possible through a 'Net-meter' .

## Benefits of on grid solar system

### 1. Huge reduction in electricity bills

With net meter in place, the consumer has to pay only for the surplus electricity he consumes, ensuring the bill generated every month is reduced drastically.

### 2. Easy maintenance

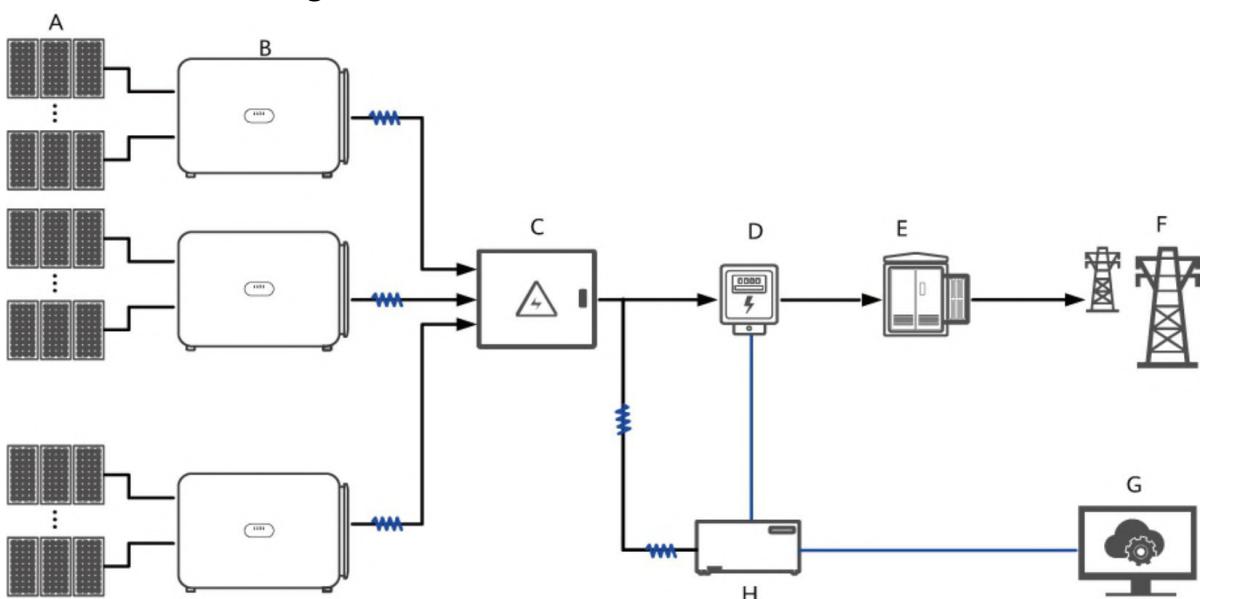
The elimination of batteries in the ongrid solar system makes maintenance quite easy.

### 3. Synchronize with other sources of power

These systems can also synchronize with a diesel generator on site. This is important in case grid power is not available.

### 4. Better ROI

The cost of an on grid solar system is lower than other types of solar systems because there are no batteries. It also generates the highest amount of power compared to other types of solar systems. The minimal maintenance and reduction in monthly power bills ensure the customer gets an ROI of 25 – 30%.



Until now, Tanso owes 10.5MW Pv-tied project generating 31.5 million kWh ,saving 11,285.00 tons of CO2.

## PV-Tied Solution- Case Study

**Qingdao Energy Company 1.49MW  
Rooftop Distributed PV Project**



Annual average power generation:

**164,63 million kWh**

Annual average coal-saving:

**592,67 tons**

Annual reduction of CO<sub>2</sub>:

**1,641,36 tons**

**Shandong Technology Company 1.75MW  
Rooftop Distributed PV Project**



Annual average power generation:

**210 million kWh**

Annual average coal-saving:

**756 tons**

Annual reduction of CO<sub>2</sub>:

**2,094 tons**

**Shandong Company 1.75MW  
Rooftop Distributed PV Project**



Annual average power generation:

**360 million kWh**

Annual average coal-saving:

**1,296 tons**

Annual reduction of CO<sub>2</sub>:

**3,590 tons**

**Shandong Company 3.16MW  
Rooftop Distributed PV Project**



Annual average power generation:

**336 million kWh**

Annual average coal-saving:

**1,290 tons**

Annual reduction of CO<sub>2</sub>:

**3,690 tons**

## PV-Tied Solution- Case Study

Shandong Zeyu New Energy Company 3.2MW  
Rooftop Distributed PV Project



Annual average power generation:

**356.3 million kWh**

Annual average coal-saving:

**1,315,08 tons**

Annual reduction of CO<sub>2</sub>:

**3642.05 tons**

Shandong New Energy Company 3.3MW  
Rooftop Distributed PV Project



Annual average power generation:

**386 million kWh**

Annual average coal-saving:

**1,425,6 tons**

Annual reduction of CO<sub>2</sub>:

**3,948,12 tons**

Shandong New Energy Company 4MW  
Rooftop Distributed PV Project



Annual average power generation:

**480 million kWh**

Annual average coal-saving:

**1,728 tons**

Annual reduction of CO<sub>2</sub>:

**4,786 tons**

Shandong Yiqian New Energy Company 4.2MW  
Rooftop Distributed PV Project



Annual average power generation:

**504 million kWh**

Annual average coal-saving:

**1,814,4 tons**

Annual reduction of CO<sub>2</sub>:

**5,025,8 tons**

## PV-Tied Solution- Case Study

**Shandong Zexuan New Energy Company 4.98MW  
Rooftop Distributed PV Project**



Annual average power generation:

**597,6 million kWh**

Annual average coal-saving:

**2,151,36 tons**

Annual reduction of CO<sub>2</sub>:

**5,958,1 tons**

**Weifang New Energy Company 9MW  
Rooftop Distributed PV Project**



Annual average power generation:

**1,028,37 million kWh**

Annual average coal-saving:

**3,702,13 tons**

Annual reduction of CO<sub>2</sub>:

**10,252,85 tons**

**Weifang District 26MW  
Ground Power Station**



Annual average power generation:

**3,380 million kWh**

Annual average coal-saving:

**12,168 tons**

Annual reduction of CO<sub>2</sub>:

**33,698,60 tons**

**Immigrant Villages Of Huanghua Town 637.1KW  
Rooftop Distributed PV Project**



Annual average power generation:

**76,45 million kWh**

Annual average coal-saving:

**275,22 tons**

Annual reduction of CO<sub>2</sub>:

**762,21 tons**

 **PV-Tied Solution- Case Study**

**Sunbelt Group 221 KW Grid-tied PV Project, Kano State,Nigeria**  
**Annual PV Power Yield: 360,000 kWh**  
**ROI: less than 2 years**

# PHOTOVOLTAIC ENERGY STORAGE WATER PUMP SYSTEM

Photovoltaic Energy Storage Water Pump System: Empowering a Sustainable Future

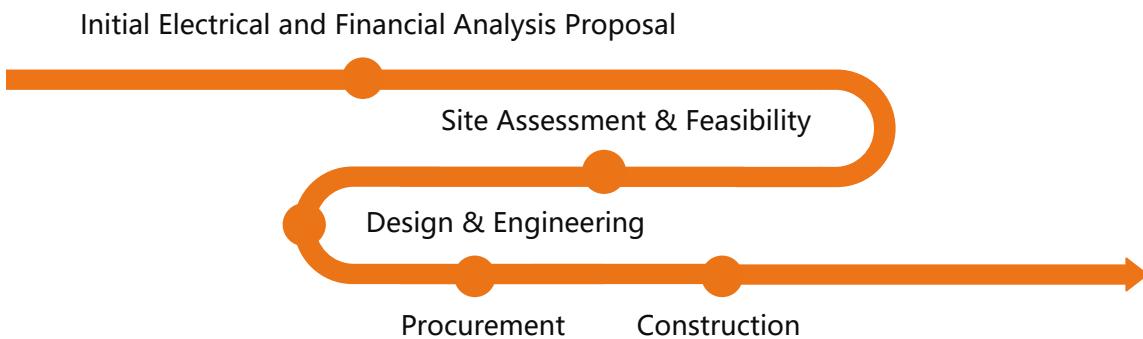
The photovoltaic energy storage water pump system is composed of photovoltaic modules, energy storage devices, controllers, water pumps, and water pipelines. Photovoltaic modules convert solar energy into direct current. The controller skillfully coordinates the distribution of electrical energy and closely monitors the system's status. The energy storage device stores excess electrical energy and supplies power to the water pump when sunlight is insufficient.

This outstanding system presents several distinct advantages. First, it greatly enhances the stability of water supply, ensuring a continuous flow even in unfavorable sunlight conditions. Second, it operates with remarkable flexibility. The pumping time can be strategically arranged according to specific needs, thereby maximizing energy utilization efficiency. Third, it strengthens disaster resistance capabilities. In the event of power grid failures or in remote areas where the power grid is unreachable, it can operate independently. Fourth, it elevates energy utilization efficiency by effectively managing and utilizing photovoltaic electrical energy.

The application scenarios of this system are extensive. In the field of agricultural irrigation, it can pump water flexibly according to the water requirement patterns of crops. It provides stable domestic water for remote rural areas and meets the water needs of the livestock industry, ensuring the drinking water supply for livestock and promoting sustainable development.



## TURNKEY SERVICE



SUNRISE is your ultimate partner in providing full turnkey solar power solutions. From initial site surveys and feasibility reports to design, production of solar supplies, installation, commissioning, and maintenance of Solar Power Plants, we offer an end-to-end service. Our commitment to delivering world-class solar technology, coupled with the expertise of our experienced delivery partners, ensures affordable, clean, and reliable solar energy solutions.

With extensive experience in both on-grid and off-grid solar installations, quality assurance is ingrained in every aspect of our business. Our highly skilled Engineering, Procurement, and Construction (EPC) team ensures seamless execution of each solar project, from concept to commissioning. We provide comprehensive training to ensure a smooth handover at the completion of the contract.

Monitoring and reporting are crucial aspects of our services. We offer real-time and historical data, performance-based alerts, and web-based monitoring systems, providing our clients with valuable insights and control over their solar power plants.



Sunrise New Energy Technology Co.Ltd

One stop solution

Reduced Fuel Consumption

Reduced Total Cost of Owership

Automatic Power Management

Access to clean energy