



ENERCON SOLAR

Enercon Solar Energy systems & Components Trading L.L.C.

500KW/1MWh Off-Grid Photovoltaic Storage Project Technical Solution



CONTENTS



Project Overview



Project Equipment



Project Overview

Project Overview and Photovoltaic-Storage Design Introduction

- **Project Information:**

100kW load Off-grid operation meets daytime and nighttime usage requirements

- **Project Purpose:**

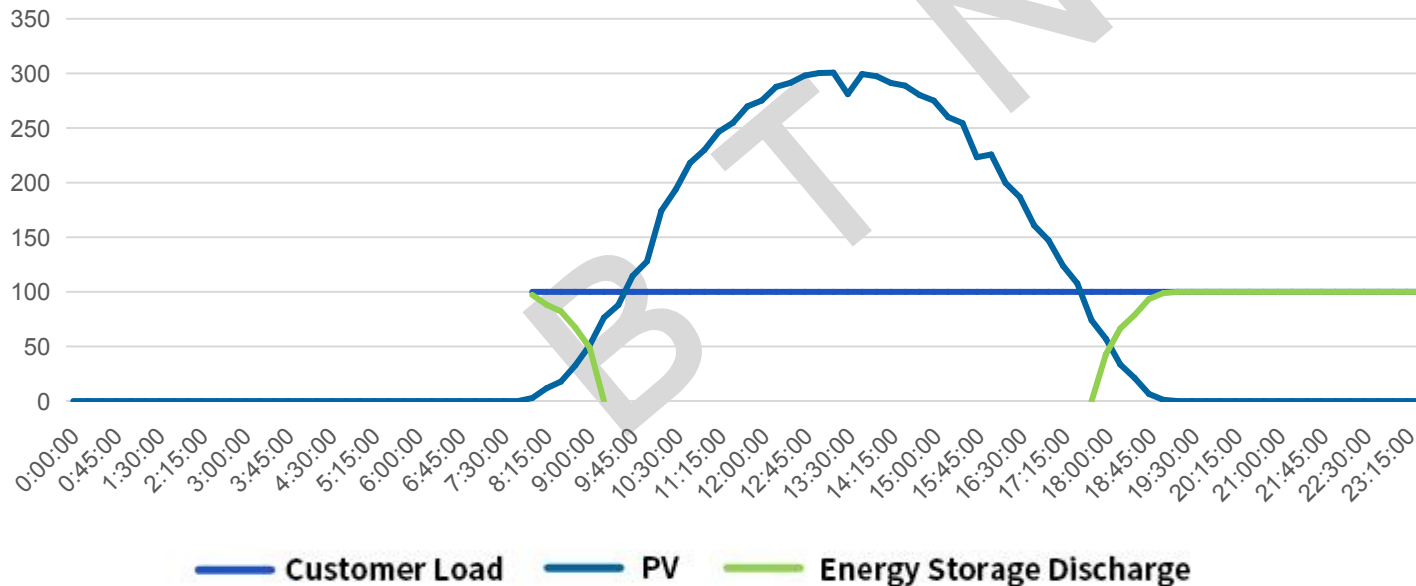
Off-grid operation

- **System Design:**

Load Electricity Consumption: $100\text{kW} \times (8\text{h daytime} + 8\text{h nighttime}) = 1600\text{kWh}$

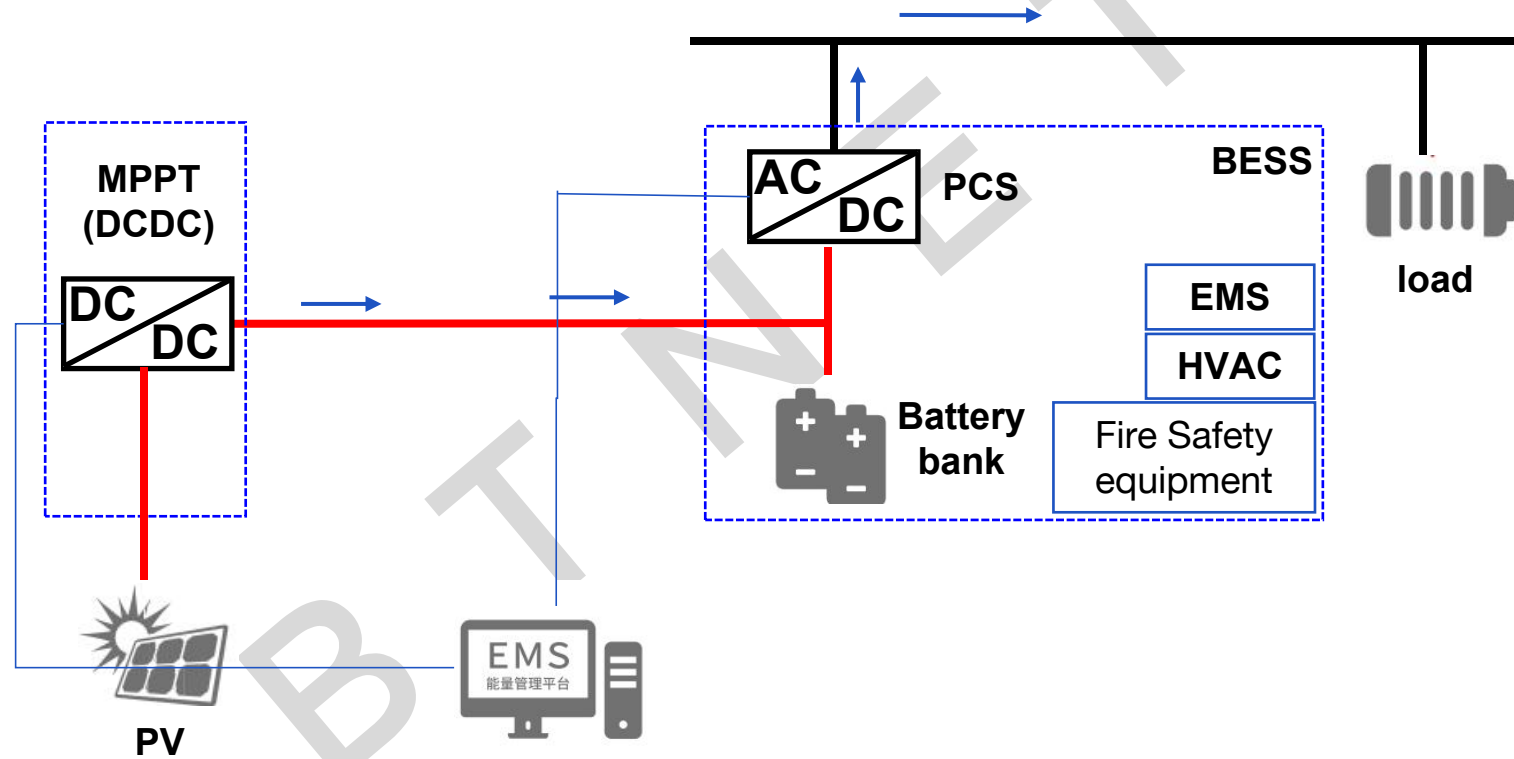
500kW PV system generates approximately 2000kWh daily, with 1MWh energy storage configured.

Photovoltaic-Storage Power Output Line



Project Overview and Photovoltaic-Storage Design Introduction

- Energy Storage System Topology Diagram:





Project Equipment

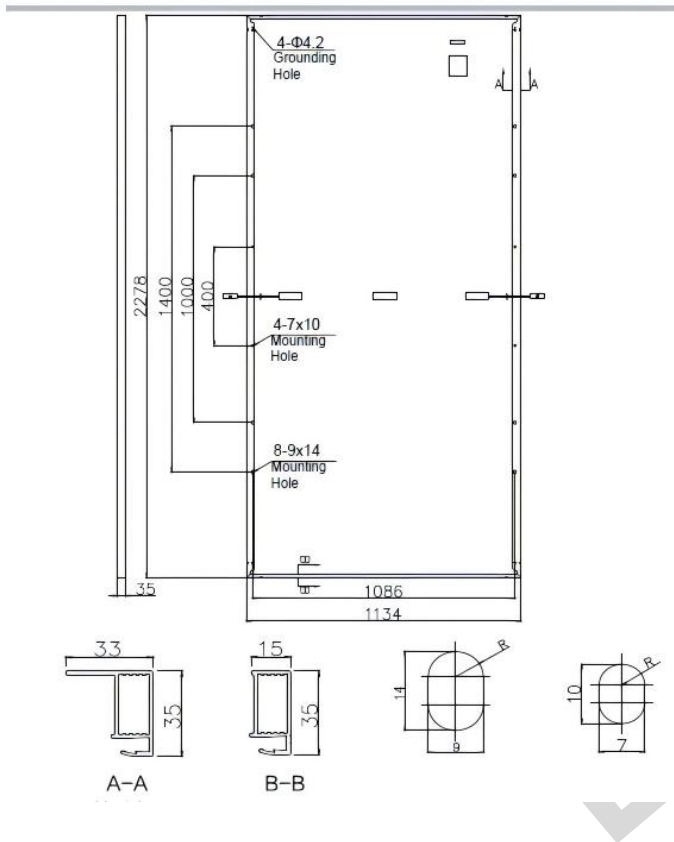
Energy Storage System Equipment List

Serial Number	Equipment Name	Specifications and Models	Unit	Quantity	Note
I	Energy Storage Cabinet	261Wh	Set	4	4 sets of 261kWh energy storage cabinets, Total installed capacity: 500kW/1044kWh.
II	PV				
1	PV panel	SK9612M-560W	piece	896	
2	DCDC	500KW (120KW*4)	Set	1	
3	PV combiner box	6in1	Set	16	
III	EMS Management System		Set	1	
IV	Power cabinet		Set	1	Optional

Introduction to Photovoltaic Storage System Components

1) Photovoltaic Module --- 560W

Assembly Drawing (Unit: mm)



Electrical Parameters @ STC

Pmax (W)	540	545	550	555	560
Power Tolerance	0~+3%	0~+3%	0~+3%	0~+3%	0~+3%
Vmp (V)	41.96	42.06	42.16	42.24	42.33
Imp (A)	12.87	12.96	13.05	13.14	13.23
Voc (V)	49.60	49.70	49.80	49.90	50.00
Isc (A)	13.74	13.84	13.94	14.04	14.14
Component Efficiency (%)	20.90	21.10	21.30	21.49	21.68

*STC (Standard Test Conditions): Irradiance 1000 W/m², Cell Temperature 25 °C, Spectrum 1.5

*Test tolerance (+3.0%)

Electrical Parameters @ NOCT

Pmax (W)	402	406	410	413	416
Vmp (V)	38.29	38.35	38.43	38.52	38.59
Imp (A)	10.50	10.58	10.66	10.73	10.80
Voc (V)	46.12	46.21	46.31	46.40	46.49
Isc (A)	11.10	11.18	11.26	11.34	11.42

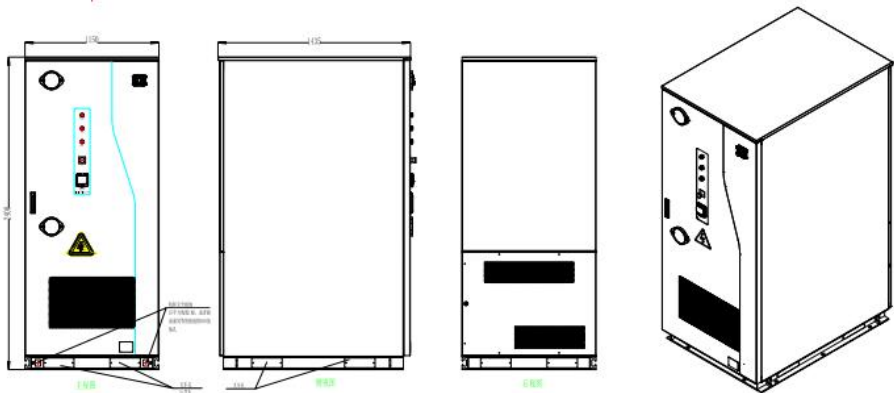
*NOCT (Nominal Operating Conditions): Irradiance 800 W/m², Ambient Temperature 20°C, Wind Speed 1 m/s

Introduction to Energy Storage System Components

2) Energy Storage Cabinet Specifications

The energy storage cabinet contains five battery boxes, one high-voltage box, a PCS, a BMS system, a thermal management system, and a fire suppression system. The battery system is equipped with a comprehensive battery management system employing a three-tier management architecture—module level, battery cluster level, and system level—to achieve full control, management, and protection of the battery system, ensuring its safe and stable operation.

The system utilizes 3.2V/314Ah cells. Each cell is connected in parallel with 52 others to form a 52.2496kWh battery module. Five such modules are then connected in series to form a 261.284kWh battery cluster.



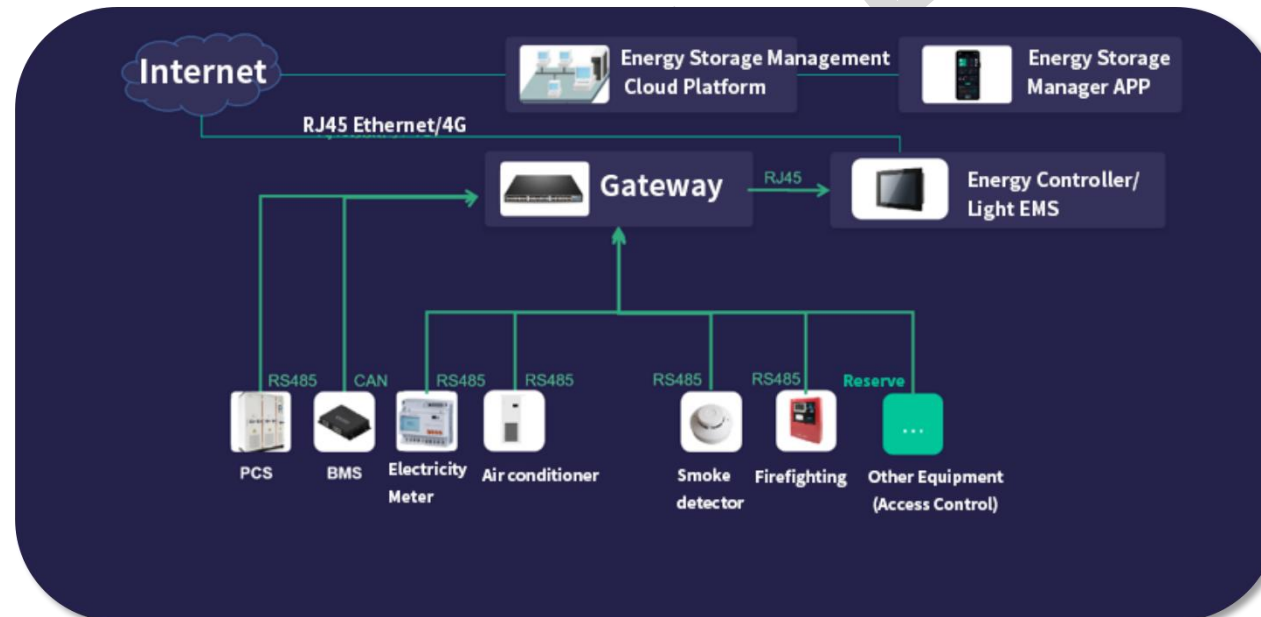
Category	Battery Type	Lithium iron phosphate
DC side	Combination Method	1P260S
	Rated Capacity (Ah)	314
	Rated Energy (kWh)	261
	Rated Voltage (V)	832
	Rated Power (kW)	130.5
	Rated Charge/Discharge Rate	0.5P
	Operating Voltage Range (V)	650 ~ 949
	Standard Charge/Discharge Current (A)	140/140
	Cooling method	液冷
	Coolant	Ethylene glycol: aqueous solution (50%v:50%v)
	Cycle count	EOL70%,6000 times,DOD95%
	Fire Protection System	Perfluorohexanone + Aerosol
	Detector Type	Thermally sensitive, CO
AC side	Rated AC Power	125kW
	AC overload capacity	1.1x Long Term, 1.2x 1min
	Wiring Method	Three-phase four-wire
	Permitted grid voltage	400V (-15% ~ +15%)
	Permitted grid frequency	50Hz ± 2.5Hz
	Total Current Harmonic Distortion Ratio	≤3%
	Power factor	0.99/-1 ~ +1
	Voltage Regulation Accuracy	≤ ± 1%
	Charge/Discharge Conversion Time	<100ms
	Maximum conversion efficiency	≥99%
	Cooling method	Forced air cooling
System	Storage ambient temperature	-20℃~45℃
	Operating temperature range	-20℃~55℃ (Derating at temperatures exceeding 45 ° C)
	Operating Humidity	0-95% (No condensation)
	Noise	≤75dB
	Corrosion Resistance Rating	C3 Option
	Protection Rating	Battery Pack: IP67 Cabinet: IP54
	Permitted Altitude (m)	≤2000 (Derating at 2000 and above)
	System Efficiency	≥86%
	Communication Interface	CAN, Ethernet
	Communication Protocol	ModbusTCP/RTU

Introduction to Energy Storage System Components

3) EMS (Energy Management System)

The energy storage system monitoring platform comprises both local and cloud-based monitoring platforms, allowing customers flexible selection based on their requirements. The energy storage system is equipped with an Energy Management Controller (EMS Controller). This controller interfaces with energy storage system units and incoming cabinet meter signals, enabling automatic charge/discharge control based on battery SOC status, meter power, or current values. It prevents reverse power flow to achieve comprehensive energy management.

The EMS energy management system enables integrated energy management for lithium battery energy storage power stations, delivering real-time monitoring, diagnostic alerts, panoramic analysis, and advanced control functions. It fulfills requirements for comprehensive operational surveillance, intelligent safety analysis, and dynamic panoramic assessment, ensuring the safe, reliable, and stable operation of energy storage power stations.



THE END