



*Green solution*



# *HKD Battery Energy Storage System (BESS) Solutions*



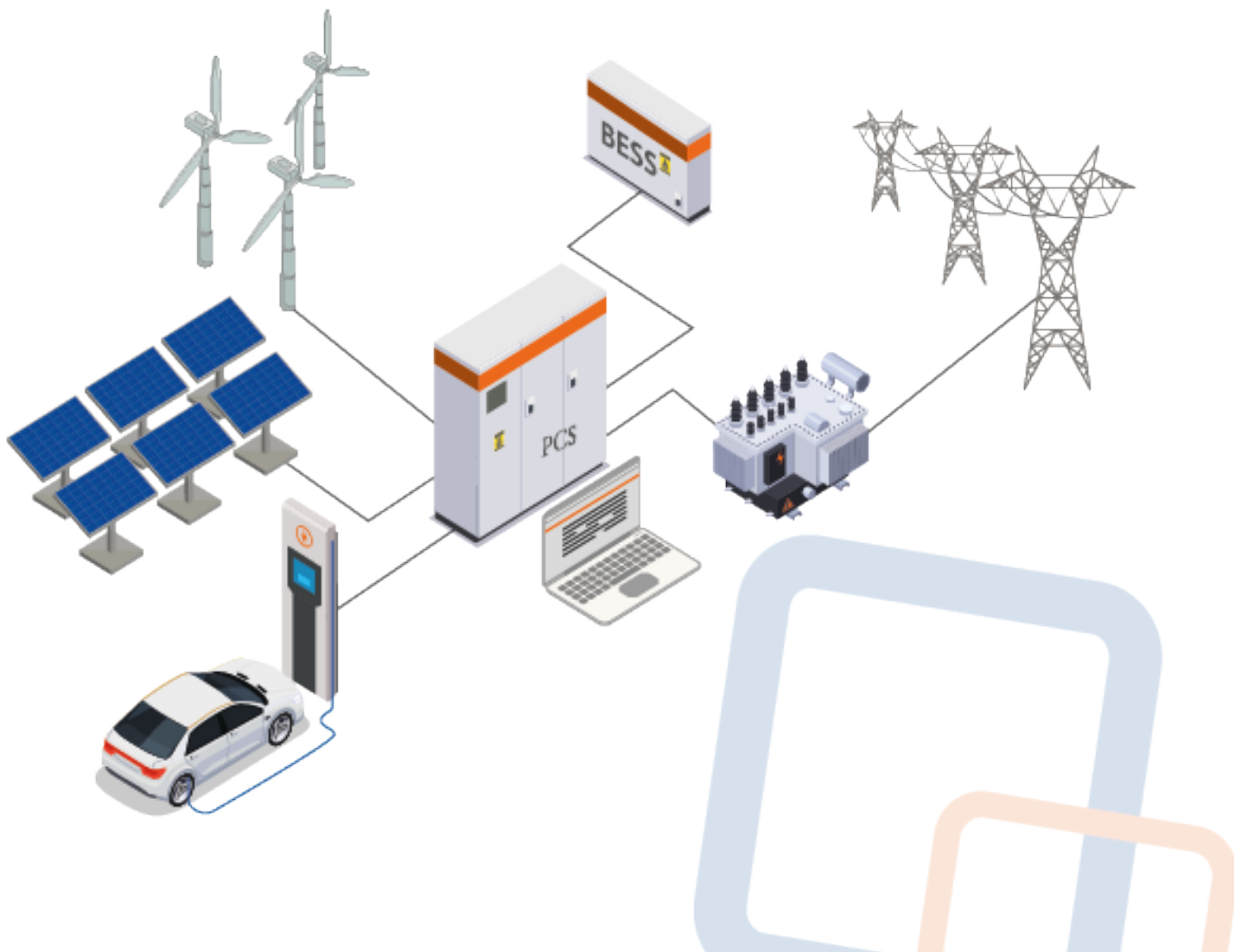
[www.hkdgreentech.de](http://www.hkdgreentech.de)

# WHY ENERGY STORAGE?

A battery energy storage solution offers new application flexibility and unlocks new business value in the energy value chain, from the production, transmission and distribution of conventional electricity, and renewable energy, to industrial and commercial sectors. Energy Storage supports a variety of applications including renewable hardeners production, stabilization of the electric grid, control of energy flow, Optimizing asset performance and generating new revenue.

HKD BESS is a completely stand-alone solution that has been developed Based on offering flexible, scalable and highly efficient architecture flexibility, helping to minimize energy costs and maximize renewable energies.

Intelligent energy consumption, cost reduction, flexibility, resource saving, environmental efficiency - this is not a complete list of benefits offered by a battery energy storage system (BESS). With a wide range of power and storage capacity, BESSs range from small-sized .household devices to large-scale systems used for municipal and industrial applications





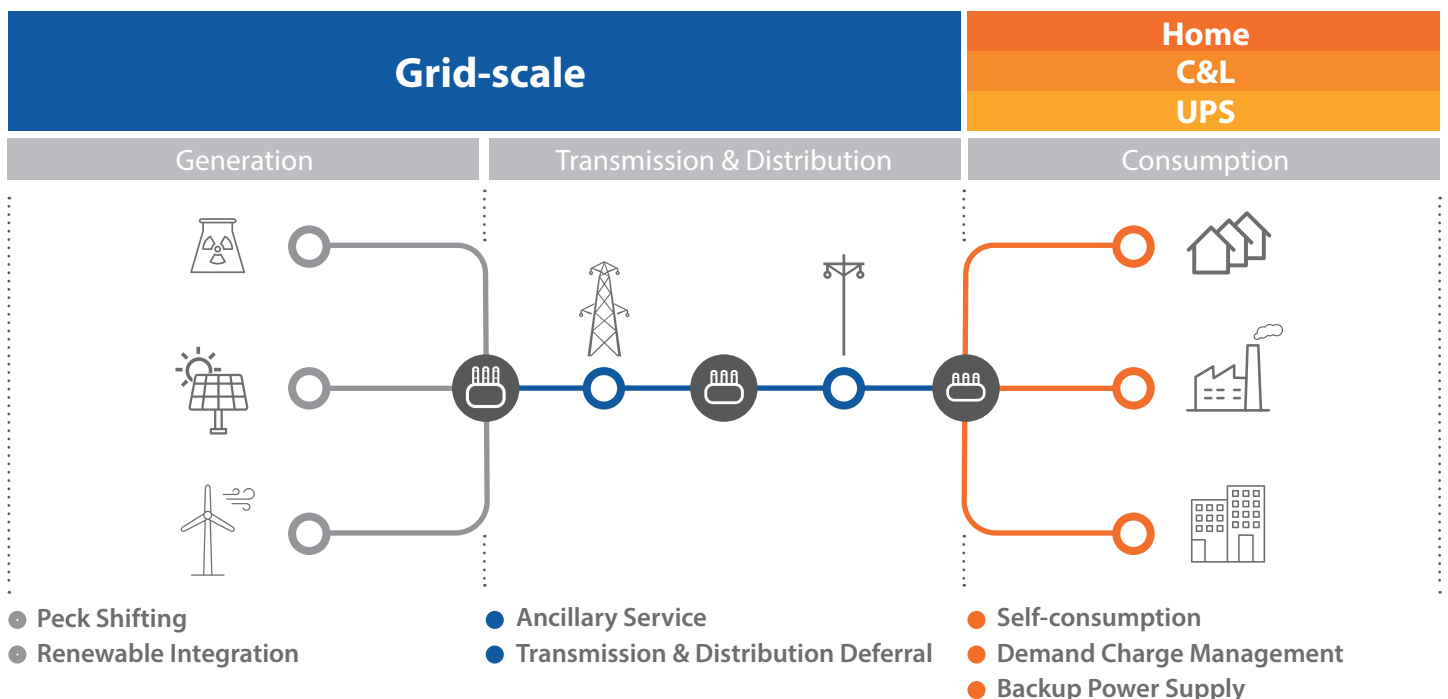
## Key Applications

- ◆ Commercial and Industrial Buildings
- ◆ Small and Medium Buildings
- ◆ Microgrid Systems
- ◆ Renewable Energy self-consumption
- ◆ Back-up and off grid solution
- ◆ Load shifting / Peak shaving
- ◆ Microgrids / Mini-grids
- ◆ EV fast charging station solution



## Our Expertise

- ◆ BMS hardware and software design
- ◆ ESS system design and integration
- ◆ Battery & system products manufacturing
- ◆ Solution technical support and consultation
- ◆ Remote monitoring and online management



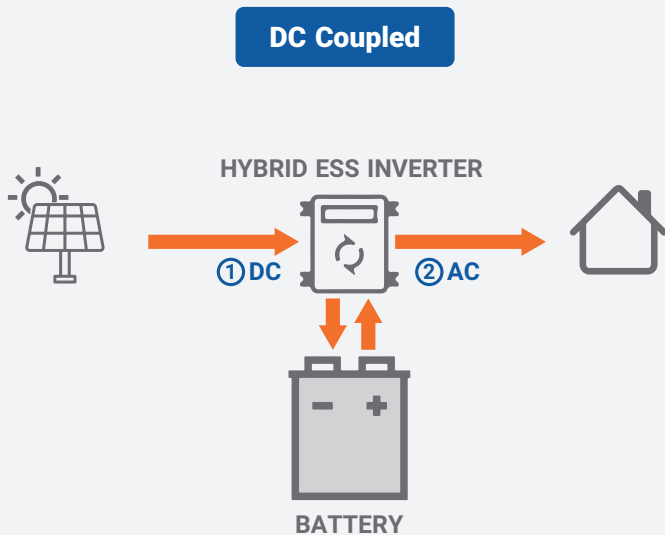


# Our Products

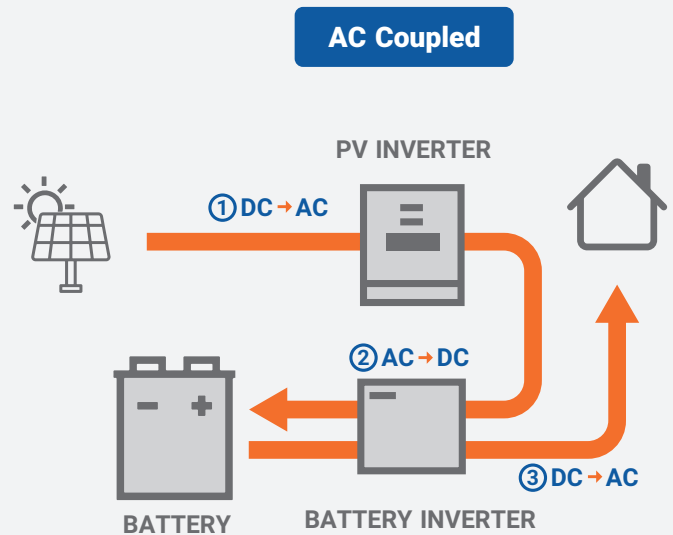
Advanced battery storage products and intelligent energy management solutions for residential, commercial and industrial applications.

# Residential

Our residential energy storage solution covers single phase 5kW and three phase 10kW, this range is mainly designed for PV self-consumption, back-up power, load shifting and off-grid for household application.



Power Conversion by Two Step



Power Conversion by Three Step

## Technical Data

### Home 3

Max. PV Output Power (kW)	3kW
Max. PV Input Power (kW)	5kW
Type & Phase	DC - coupled, 3-Phase
No. of MPPTs	3
Max. Battery Output Power (kW)	3kW
No. of Battery Channels	1
Usable battery capacity	3.6kWh
Product Warranty	6 years
App for Installation	Yes
Monitoring App/Web	Yes

Our Commercial energy storage solution covers everything from 30kW to 300kW, we have delivered hundreds of projects covering most of the Commercial applications such as demand charge management, PV self-consumption and back-up power and off-grid.

## Technical Data

### Type designation

#### Battery outdoor cabinet data

Battery type	LiFePO4 Prismatic Cell
Battery module	6.9 kWh, 57 kg
Battery module number	9
Nominal energy	62
Nominal voltage	750
Operating voltage	650 - 800
Max. charging/discharging rate	≤0.5C
Depth of discharge	100 %
Dimensions (W*H*D)	1300*2400*1000 mm
Installation location	Outdoor
Degree of protection	IP54
Allowable relative humidity range	0% to 95% (non-condensing)
Operating temperature range	-20 °C to 50 °C (> 45 °C derating)
Max. operating altitude	3000 m (> 2000 m derating)
Communication interfaces	CAN2.0B
Cooling concept	Heating, ventilation and air conditioning
Certificates	IEC 62619, IEC 62477, IEC 62040, IEC 61000, UN 38.3

#### Ac outdoor cabinet data

Nominal AC power	50 kW
Max. THD of current	< 3 % (at nominal power)
DC component	< 0.5 % (at nominal power)
Nominal grid voltage	400 V
Grid voltage range	360 – 440V
Nominal grid frequency	50 Hz
Grid frequency range	45 – 55 Hz
Isolation method	Transformer*
Dimensions (W*H*D)	1000*2400*1000 mm
Degree of protection	IP54
Anticorrosion grade	Standard C5 (optional: C4)
Allowable relative humidity range	0% to 95% (non-condensing)
Operating temperature range	-20 °C to 50 °C (> 45 °C derating)
Operating altitude	3000 m (> 2000 m derating)
Communication interfaces	RS485, Ethernet
Communication protocols	Modbus RTU, Modbus TCP
Certificates	IEC61000, IEC62477, AS4777.2, NRS 097-2-1

# PV-ESS-EV charging station solution

HKD has accumulated rich experience in the field of PV-ESS-EV charging applications, and can provide a variety of flexible solutions for charging stations, including hybrid inverter solutions and containerized ESS solutions, to help customers solve the problems of long construction time for capacity expansion and low utilization rate. This solution make the charging station cleaner and more convenient for the people travel.

## Safe and Reliable

It has a complete safety protection strategy, which can effectively deal with overload, short circuit and abnormal power grid conditions; more than 100MW successful application cases;

## Efficient & Flexible

The maximum efficiency more than 98.7%; it can realize the integration of PV, energy storage and battery;

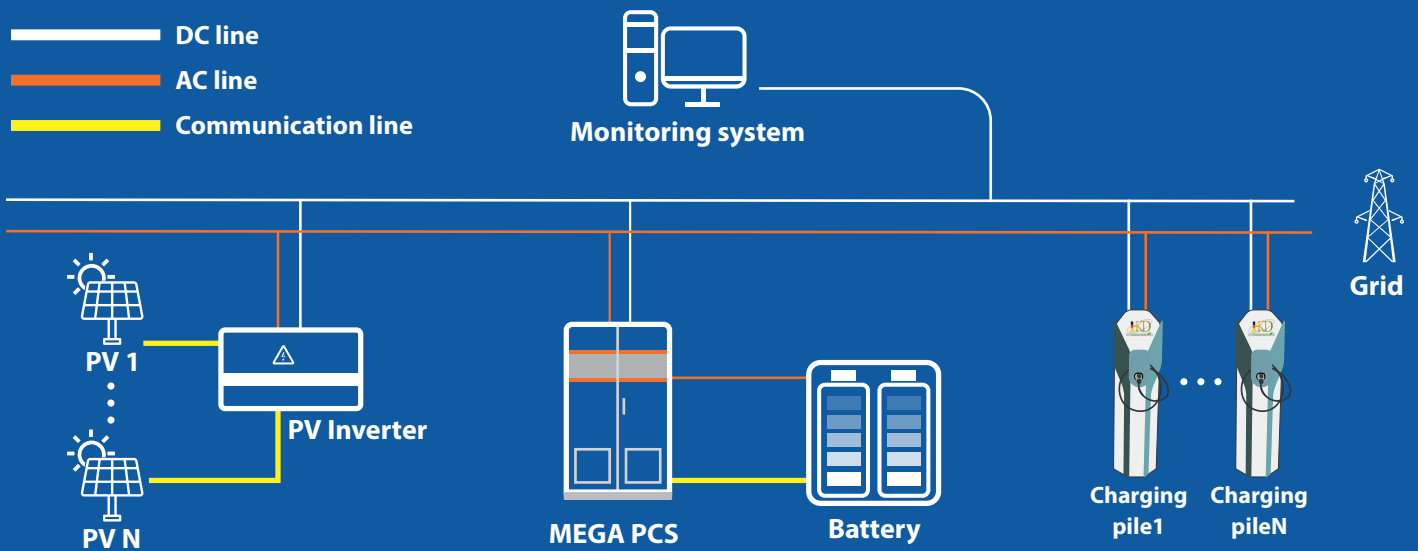
## Intelligent & Friendly

Support on/off-grid mode switching function, Support PV MPPT control;

## Economical and Durable

The design life of the scheme is more than 25 years; Short investment return cycle;

## Solution Connection Diagram



PV-ESS-EV charging station solution designed by HKD can effectively solve the difficulties of the transformer capacity expansion, long construction time and efficient utilization of new energy power, and can meet the rapid charging demand in the public transport power supply stations. This solution supports self-consumption, on / off grid switching and peak load shifting.



# INDUSTRIAL

We customize ESS solutions for industrial applications:

- ◆ PCS: 250kW, 500kW, 1MW expandable to MWs.
- ◆ Battery: 6.9kWh (1C) module, LiFePO4 chemistry
- ◆ BMS: Intelligent battery management system
- ◆ EMS: Intelligent energy management system

## Container:

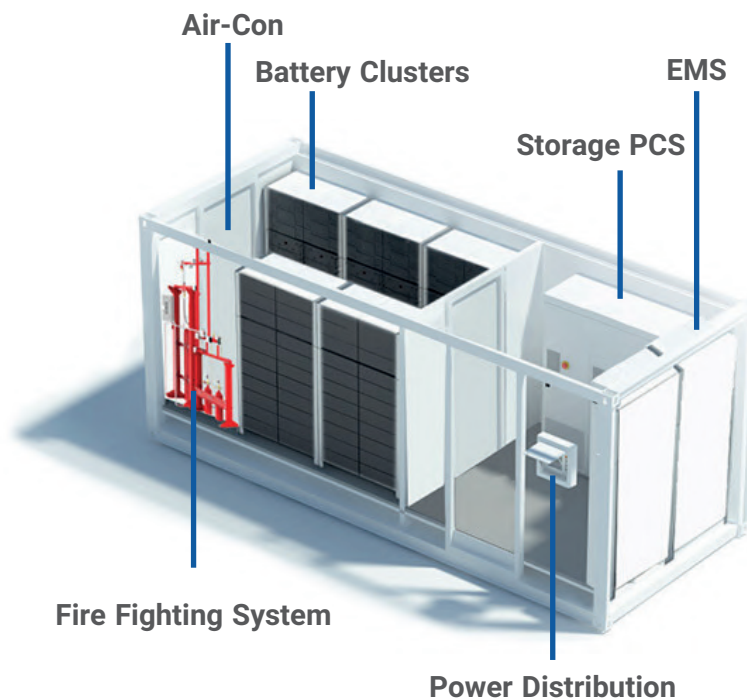
If a container is used, our standard ESS container includes the following facilities:

- ◆ Fire fighting system
- ◆ Air-conditioning system
- ◆ Ventilation system
- ◆ Lighting system and power distribution system

Depending on the application, the maximum capacity in container would be different:

- ◆ 10feet - 300kWh (1C)
- ◆ 20feet - 600kWh (1C) / 1.1MWh (0.5C)
- ◆ 40feet - 1.26MWh (1C) / 2.5MWh (0.5C)

Industry has shown a recent interest in moving towards large scale and centralized medium-voltage (MV) battery energy storage system (BESS)





# Technical Data

System Type	
Battery Data	
Cell type	LFP
Configuration on system	228S16P
Battery capacity (BOL)	1000 kWh
Battery voltage range	650 – 800 V
BMS communication interfaces	RS485, Ethernet
BMS communication protocols	Modbus RTU, Modbus TCP
AC Data	
Nominal AC power	500kVA
Max. THD of current	< 3 % (at nominal power)
DC component	< 0.5 % (at nominal power)
Grid voltage range	10 – 35 kV
Power factor	> 0.99 (at nominal power)
Adjustable power factor	1.0 leading – 1.0 lagging
Nominal grid frequency	50 / 60 Hz
Grid frequency range	45 – 55 Hz / 55 – 65 Hz
Isolation method	Transformer
Transformer	
Transformer rated power	500 kVA
LV/MV voltage	0.4 kV / 10 – 35 kV
Transformer vector	Dy11
Transformer cooling type	ONAN (Oil Natural Air Natural)
Oil type	Mineral oil (PCB free) or degradable oil on request
General Data	
Degree of protection	IP54
Operating temperature range	-30 to 50 °C / -22 to 122 °C ( > 45 °C / 113 °C derating)
Relative humidity	0 – 95 % (non-condensing)
Max. working altitude	1,000 m (standard) > 1,000 m (optional)
Cooling concept of battery chamber	Heating, Ventilation and Air Conditioning
Cooling concept of PCS chamber	Temperature controlled forced air cooling
Fire suppression system of battery unit	Novec1230 extinguishment system
Communication interfaces	RS485, Ethernet
Communication protocols	Modbus RTU, Modbus TCP, IEC 104
Compliance	CE, IEC 62477-1, IEC 61000-6-2, IEC61000-6-4, IEC62619

# **BESS Farm**



## **HIGH INTEGRATION**

Highly integrated energy storage system for easy transportation and O&M

Advanced integration technology ensures optimal system performance and lower cost



## **EFFICIENT AND FLEXIBLE**

Intelligent cell-level temperature control ensures higher efficiency and longer battery cycle life

Modular design supports parallel connection and easy system expansion



## **SAFE AND RELIABLE**

DC electric circuit safety management includes fast breaking and anti-arc protection

Multi-state monitoring and linkage actions ensure battery system safety



## **SMART AND FRIENDLY**

Integrated local controller enables single point of communication interface

Fast state monitoring and faults record enables pre-alarm and faults location







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*the Future is Green Energy*

## *Contact Us*

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