CHS2 Series Introduction

Revolutionize Energy Storage Solutions

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Advantage of CHS2

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Typical Application

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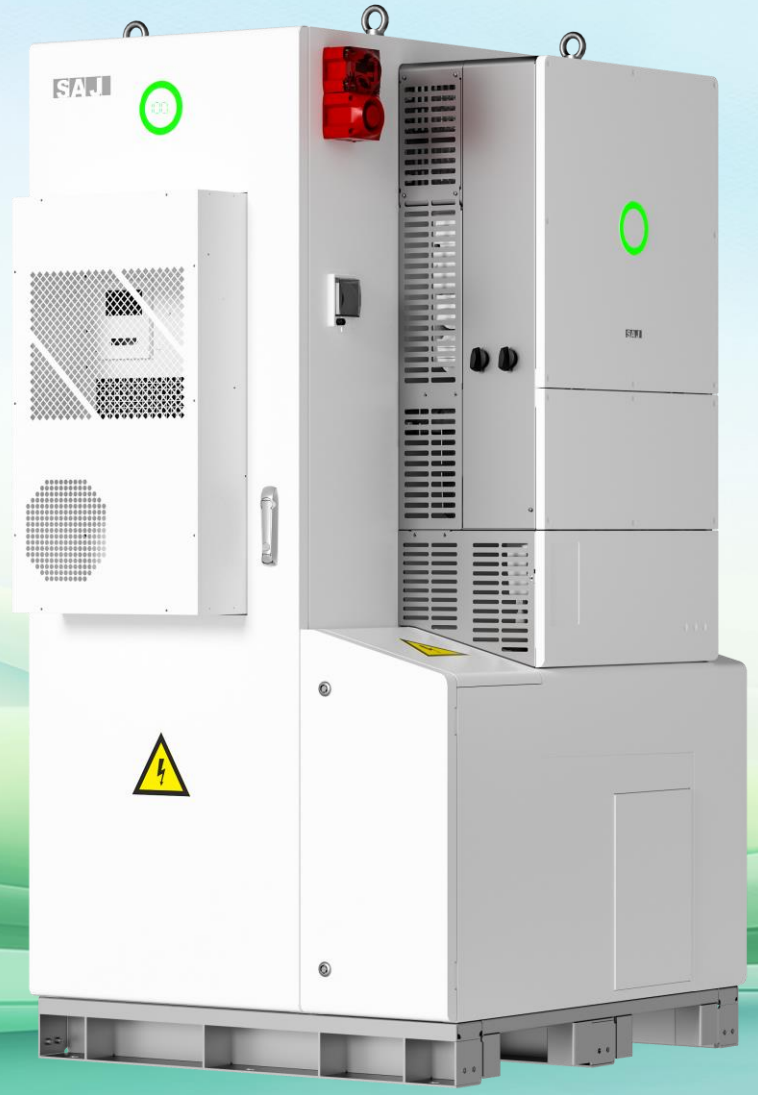
Case Study

C&I ALL-IN-ONE Hybrid PV ESS Solution



Better Performance

- String current 22.5A, matching high power (210) PV panel
- 6 MPPT, support 200% oversizing
- Adopting C&I 280Ah cell, good performance and higher energy density

Ultimate Safety

- AFCI as standard to prevent fire
- Support core health warning, CO, fire detection, cabinet-level fire protection
- AC and DC type II SPD

Highly Integrated

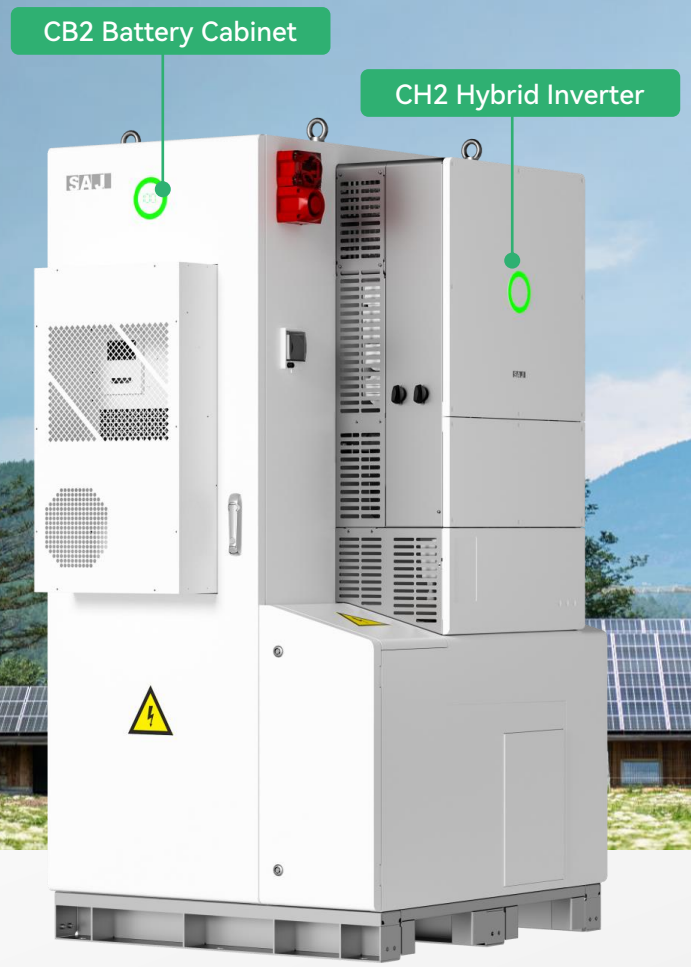
- pre-installed in the factory, no need for on-site installation and debugging
- Accessing to DG(diesel generator), no need for additional equipment
- AC coupling available

Higher Revenue

- PV and Battery are dc coupled with high efficiency
- Wide environmental adaptability improves VPP revenue
- Intelligent scheduling, and multiple scheduling modes

CHS2-29.9K-T4-X | CHS2-30K-T4-X | CHS2-40K-T5-X | CHS2-50K-T6-X | CHS2-63K-T6-X

C&I ALL-IN-ONE Hybrid PV ESS Solution



CHS2-50K-T6-X

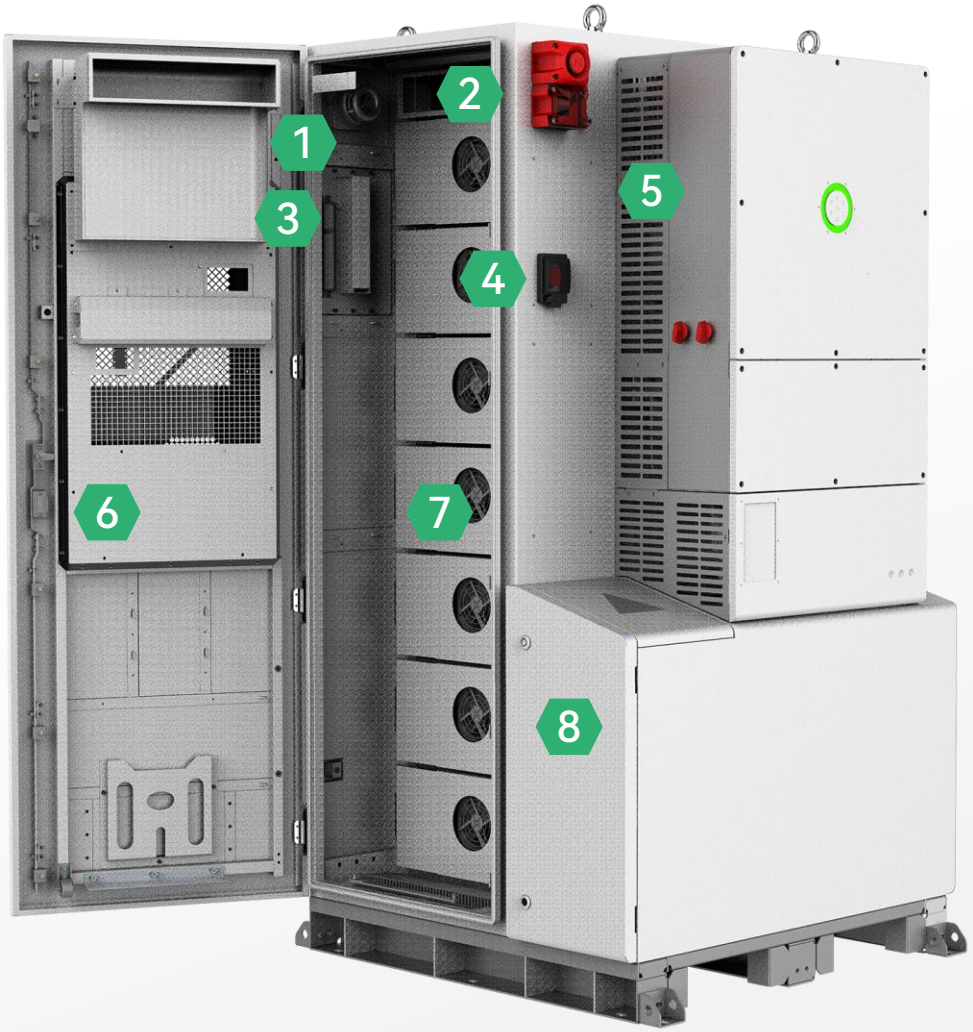
Main Configuration

- DC PV Inputs: Max 100kWp
- DC Battery integrated
  - 100.3kWh standard
  - 3 More Battery Cabinets connect with CHS2, means 50kW/400kWh
- AC Output [On Grid]: Max Apparent Power: 55kVA
- AC Output [Back Up]: Support
  - Max output: 55kVA
  - Peak Output: 75kVA for 5s
- AC Input [Diesel Generator]: Support

System Configuration

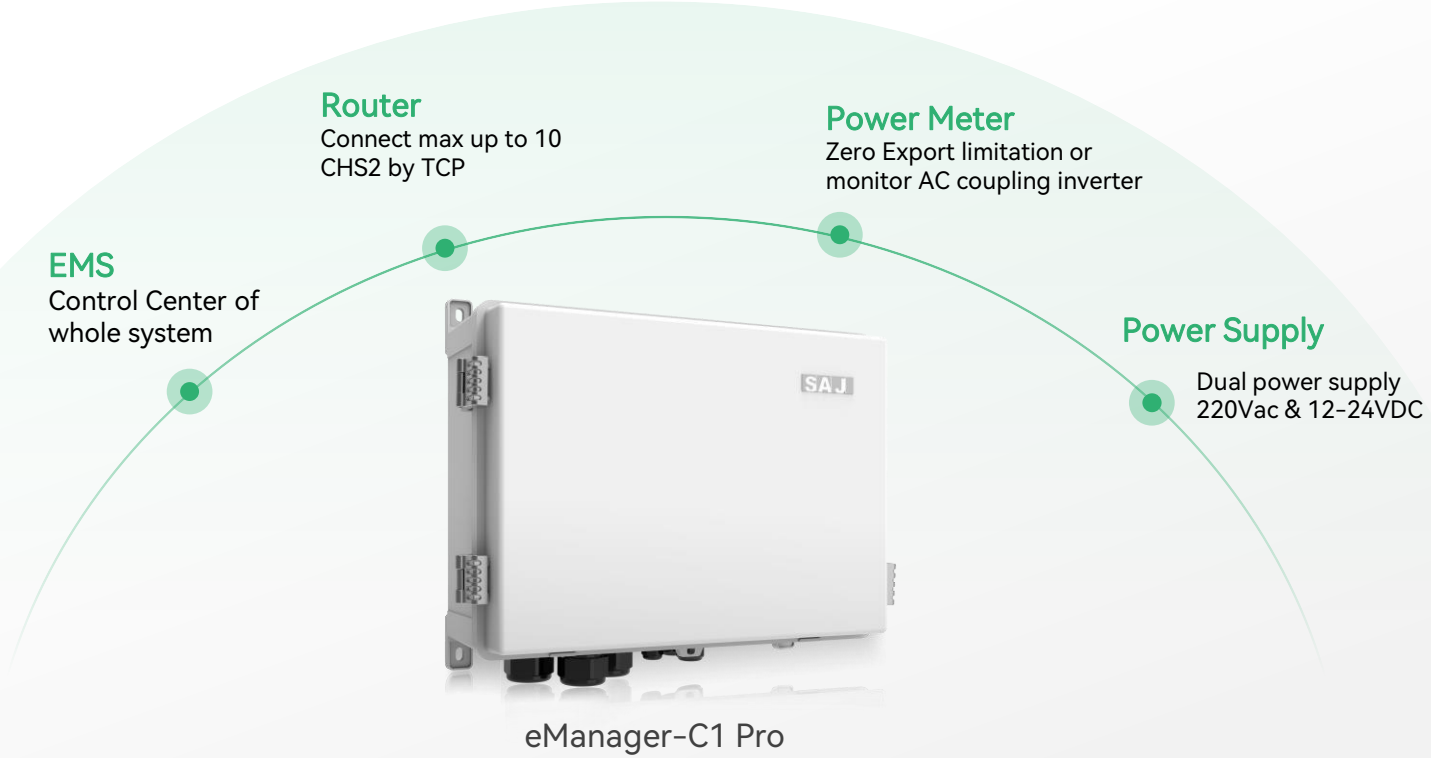
- Max 10 parallel connection
- Battery capacity: 57kWh-2MWh

C&I ALL-IN-ONE Hybrid PV ESS Solution



1. Smoke\CO\Temperature\Humidity detector
2. Sound and light alarms for firefighting
3. Aerosol fire extinguishing system
4. Emergency stop button
5. CH2 hybrid inverter
6. Air conditioner
7. Battery pack 1P16S 14.3kWh
8. Battery high voltage control box

Smart EMS for Multi-Application with CHS2

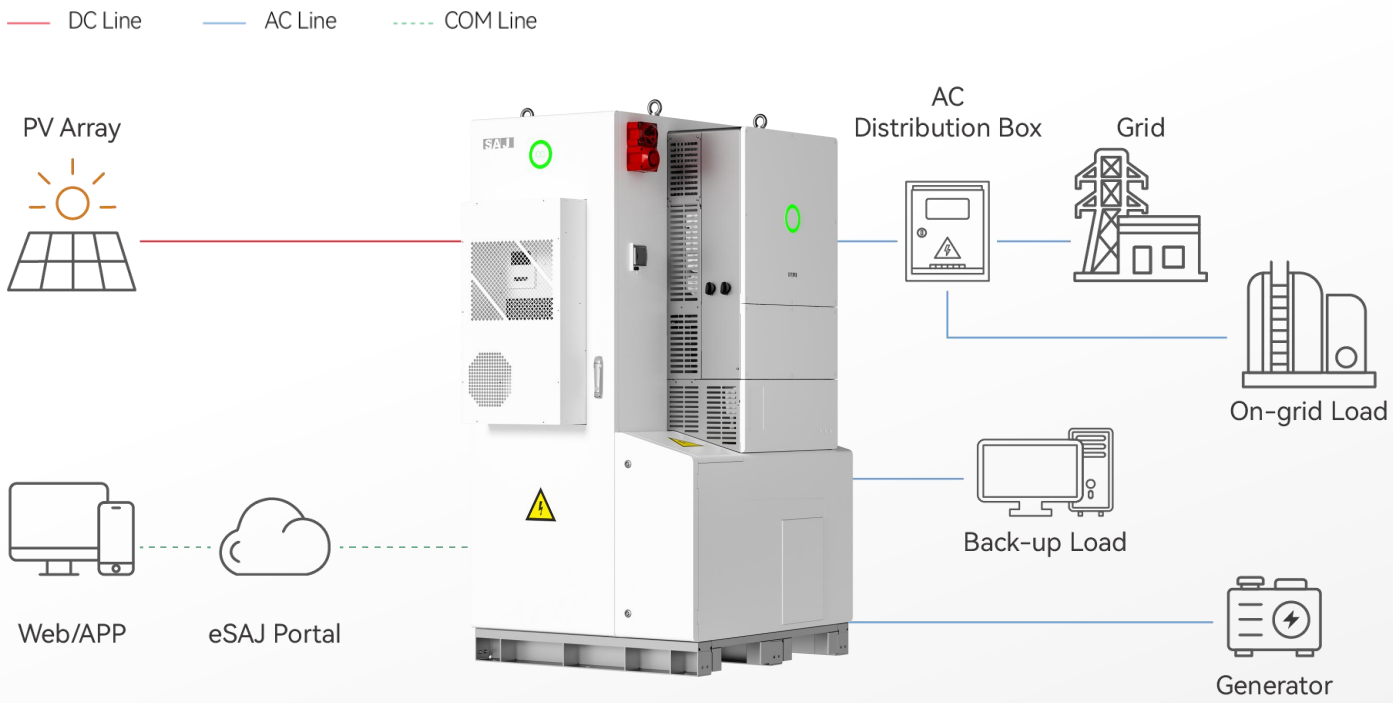


eManager-C1 Pro

Tips: Max 3 power meter connect for different application scenarios

No	Model	Description
1	eManager-C1 Pro	EMS、Ethernet Switch、Power meter *1 integrated
2	DTSU666 1.5(6)A	2 more meters accesses to EMS supported (grid side and PV inverter side)
3	CTSA024-250A-5A	250A/5A current transformer
4	CTSA035-500A-5A	500A/5A current transformer
5	1000A CT NLH2-0.8 100	1000A/5A current transformer

One for ALL, Multi-Application Support



Efficient & Green

Stable & Reliable

Convenient Installation

Multiple Security

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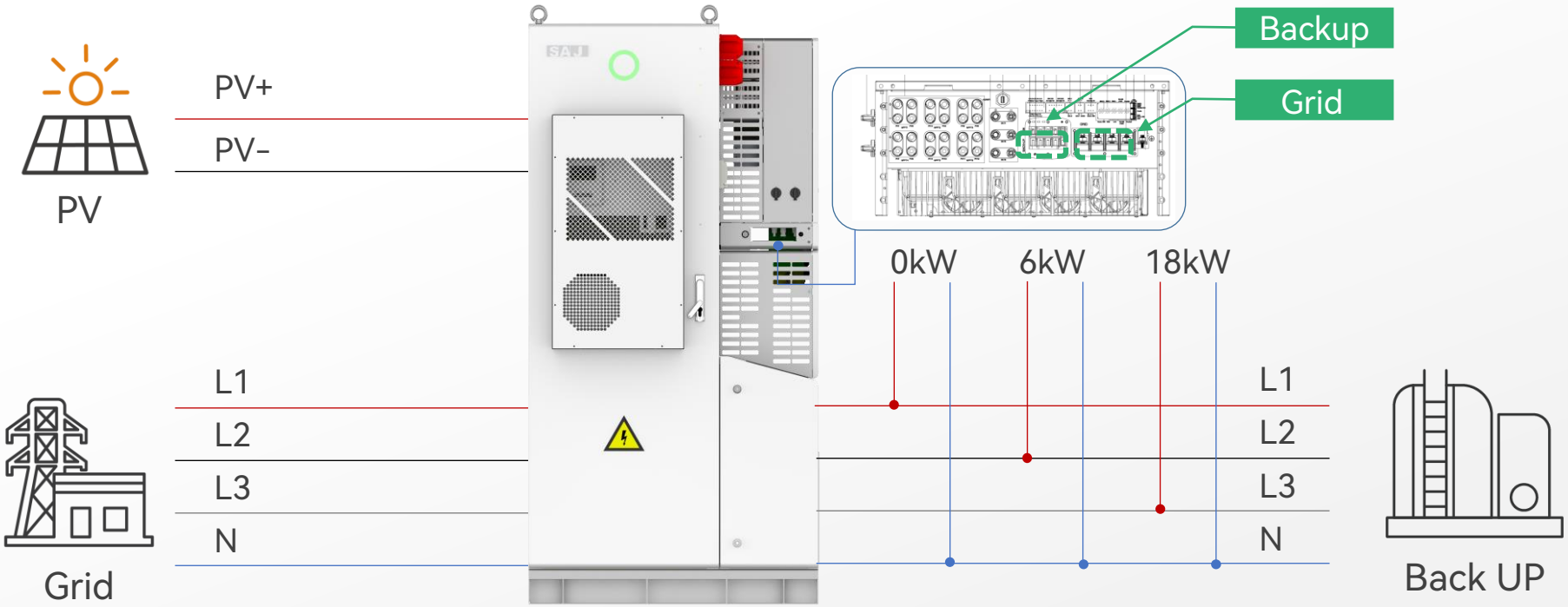
Real Backup Ready with 100% Imbalance Loads Support



1.5 Times short time overloading

UPS Level On-Off Grid Switch

100% Three Phase Imbalance Loads

* Max 18.3kW load per Phase

Achieve Energy Independence, Reduce Fossil Fuel Dependence

Off-Grid Solar Power Integrated Energy Solution

- Utilizing solar and ESS, fewer generator running hours (12-20/day > 2-4/day)
- A significant decrease of 70-80% in the usage frequency of diesel generators.
- Meeting green and independent energy needs for medium, and small power scenarios

Simpler Projects

Solar power and battery storage system integrated, and flexible modular deployment solution simplifies project processes

Optimal hardware design

Better suited for off-grid and weak-grid areas, managing load-shedding 3-4 times per day or even more

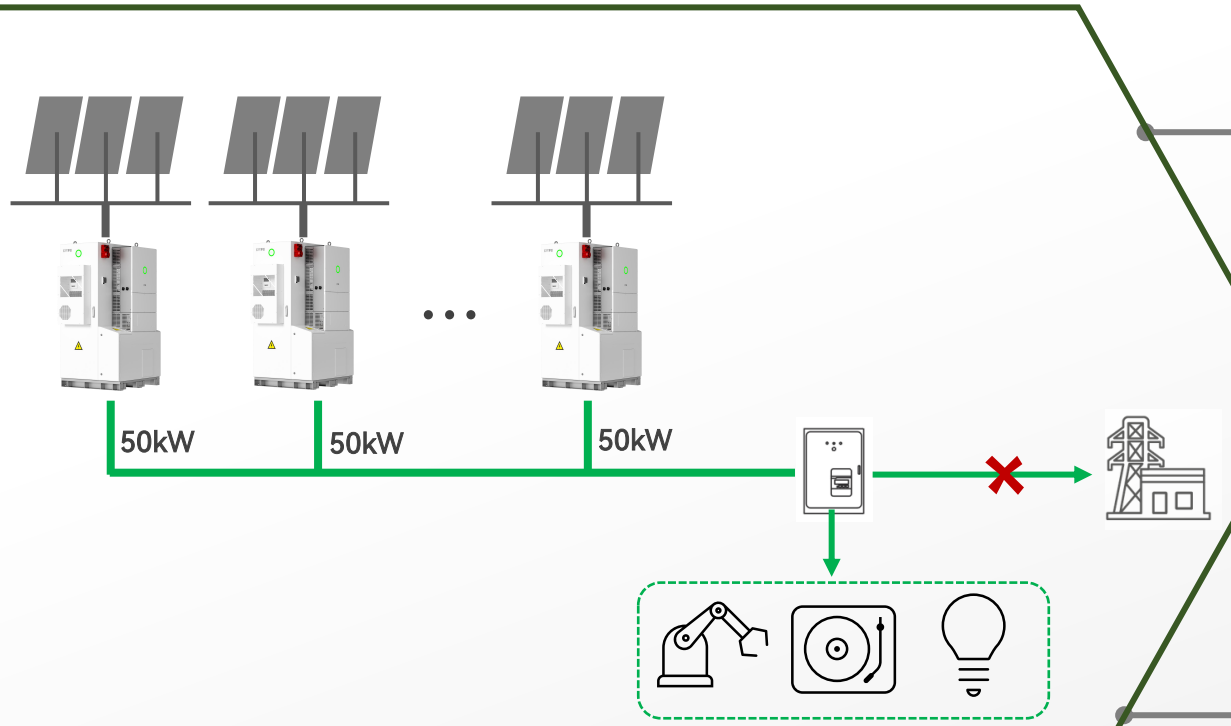
Cost Efficiency, Affordable energy

DG LCOE: 0.3~0.6 $/kWh

SAJ All-in-one solution LCOE: 0.04 $/kWh (10 year)

Payback Period:2-3 years

Powerful, Stable, and Efficient Energy Supply



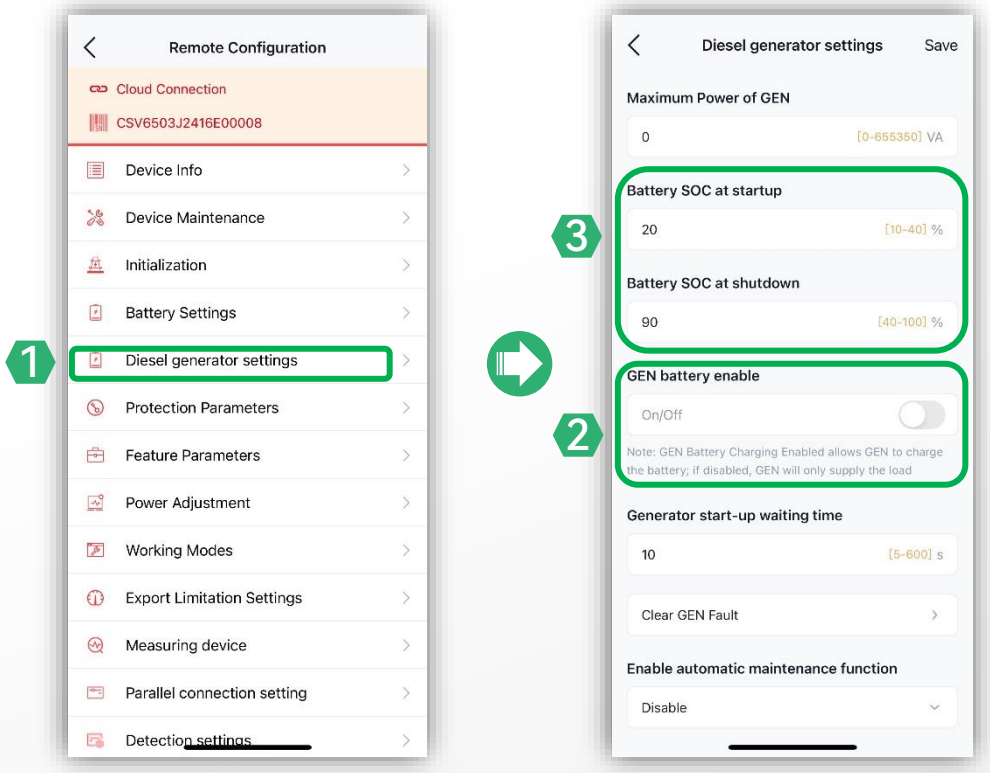
01 Quickly responds to load power changes with 1.5x short-term overload capacity(75kW ,5s), supports high-power load startup.

02 Provides continuous full-power output without derating in off-grid mode.

03 Supports 10 on-off grid parallel units without additional control cabinets.

Diesel Generator On-Demand Operation for Battery System Charging

Flexible DG Options

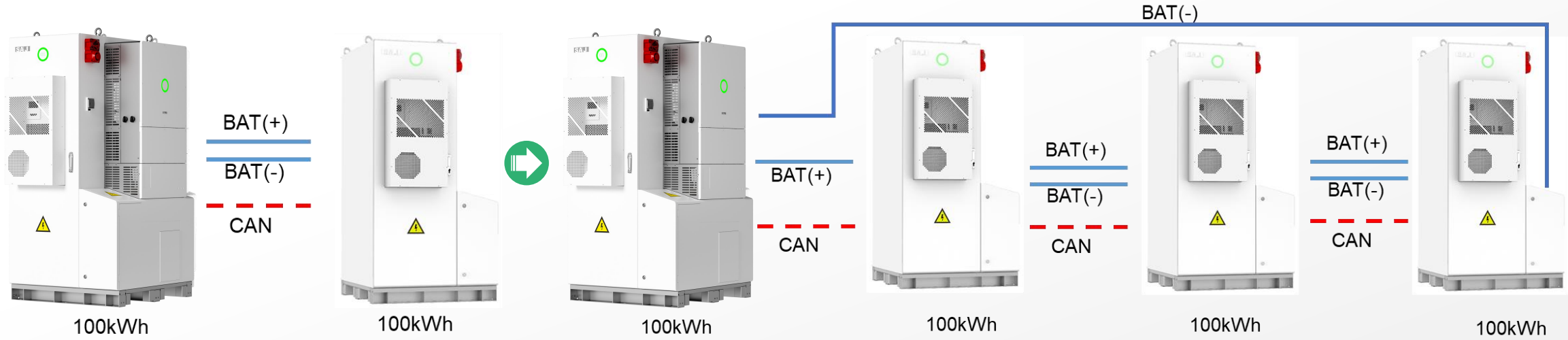


◆ **Stable and continuous diesel engine operation:**

Before: Low load at night, inefficient operation

After: Flexible setting of battery charging power, efficient DG operation

Up to 4 times the expanded battery capacity



Up to 4 battery cabinets can be coupled to increase the capacity, covering **2h/4h/6h/8h peak hour demand**

- The power and communication cables between battery cabinets are not provided in the accessory kit
- The wiring terminals are configured by SAJ
- A single CH2 supports up to 4 CB2 connections

More than 32% Lifetime Throughout Energy with 280Ah Cell

Lifetime Throughout Energy means the total discharge energy during the product life cycle.

Other solution
6000+ times cycle life

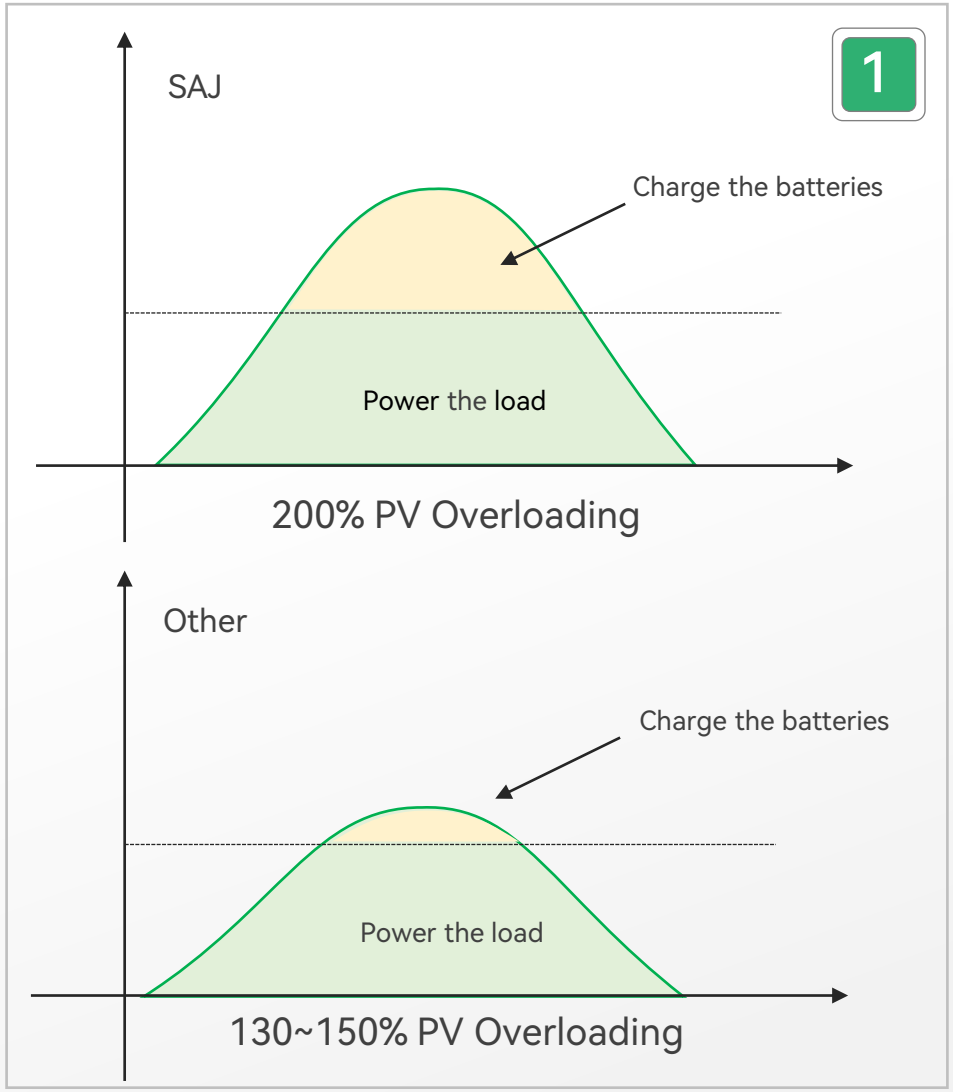
SAJ solution
8000+ times cycle life

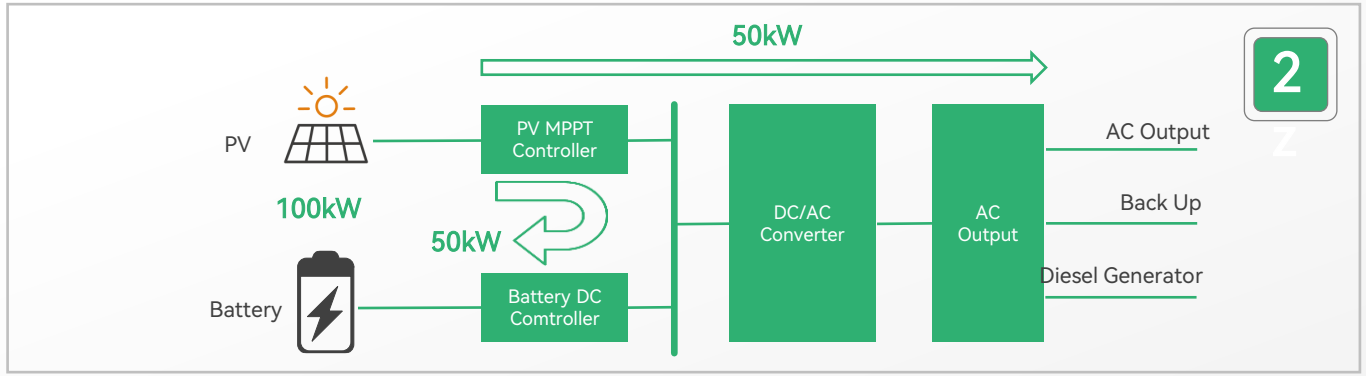
	100Ah	280Ah
Battery Type	LFP	LFP
Battery Modular Capacity	5.12kWh	14.3kWh
Battery Module Throughout Energy*	16.1MWh	61MWh
100kWh System Confi	20 Modules	7 Modules
100kWh System Throughout Energy	**322MWh**	**427MWh**

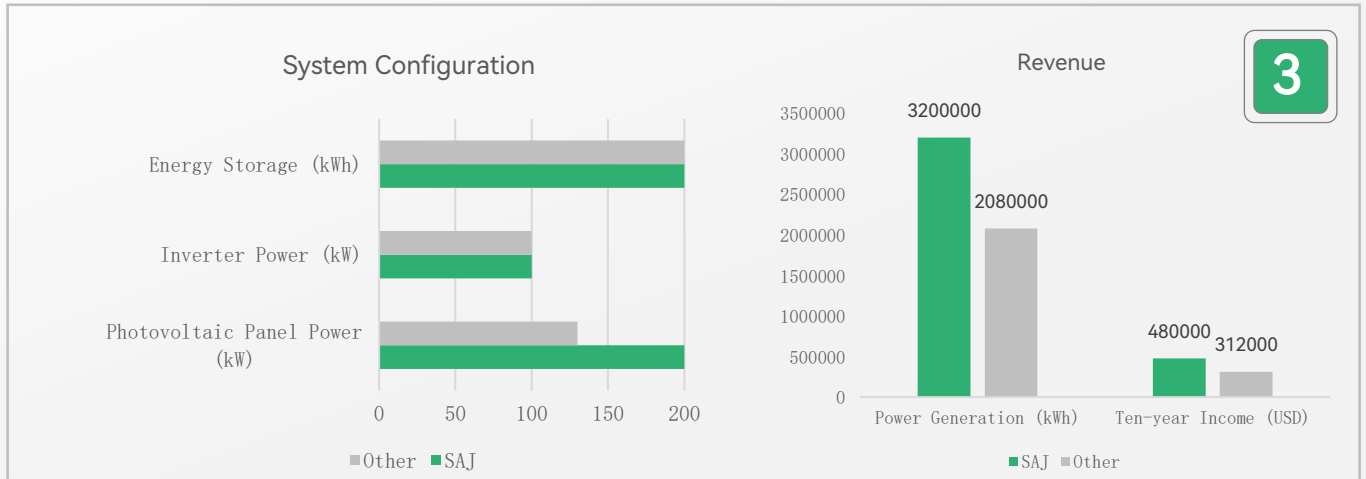
Same intial battery installation capacity **32%** more lifetime throughout energy!

* the battery cell lifetime throughout energy come from the parameter of XX module cell manufacture

54% higher yiled with 200% PV Overloading





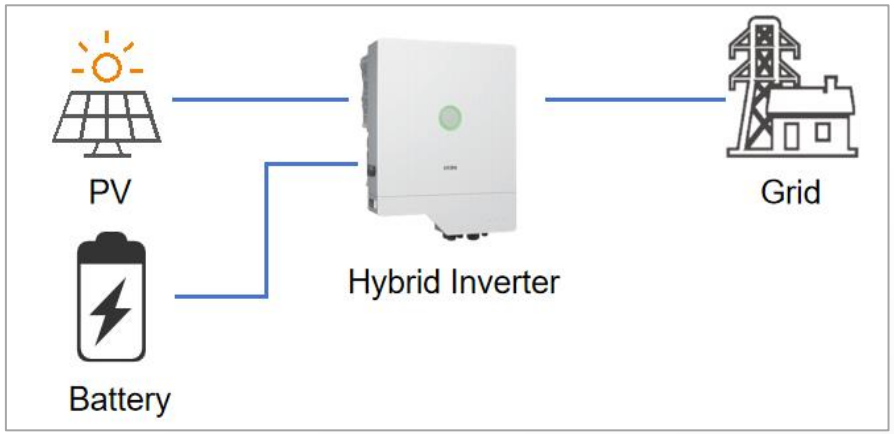


With all configurations remaining the same except for PV module Capacity

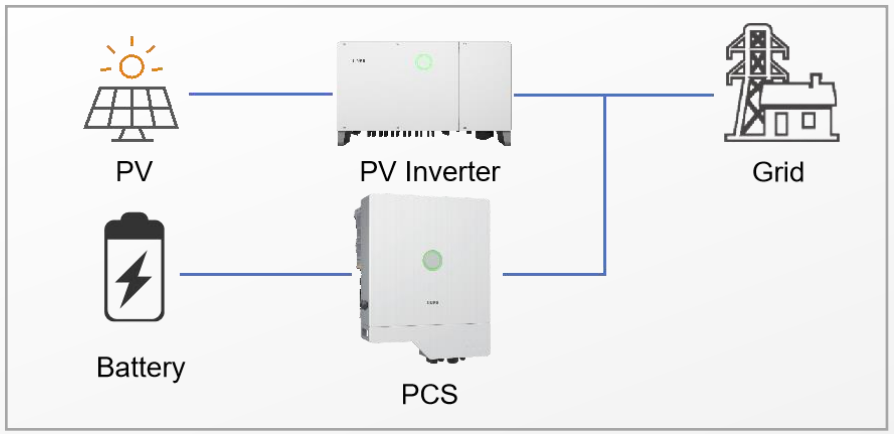
The power generation in ten years can increase by 54%

and LCOE can be reduced by 25% in ten years

Three Benefits with DC Coupling PV ESS System



DC Coupling VS AC Coupling



NO.1

Higher Efficiency

- Charing From PV to DC BUS to Battery
  Less than 2% Loss
- Charing PV to Inverter to AC Bus to PCS to Battery
  At Least 4% Loss

NO.2

Lower Installation Cost

- ALL IN ONE Design,
  No more PV inverter and cable
- Inverter and PCS seperately Installation
  Additional AC Cable connection

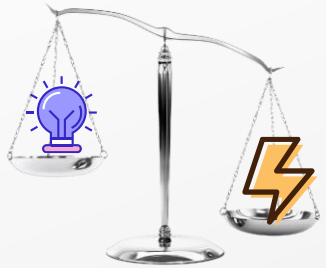
NO.3

Saving Grid Demand Capacity

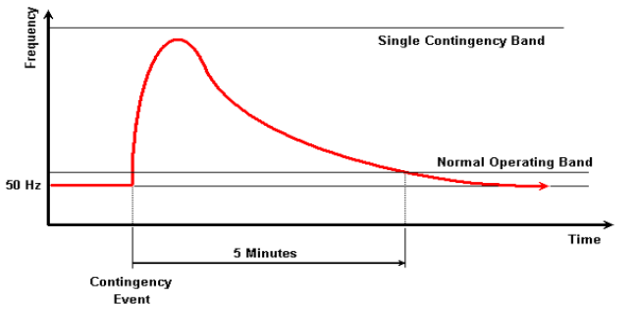
- 50kW PCS+100kWh Battery+100kWp PV
  50kW @ Grid Connection Point
- 50kW PCS/100kWh Battery+100kW inverter/100kWp PV
  150kW @ Grid Connection Point

Matching the Demands of Electricity Ancillary Services/Trading Market

Renewable energy access exacerbates grid imbalances



Electricity Ancillary Services/ Trading Market are required



Frequency Reserve and Control

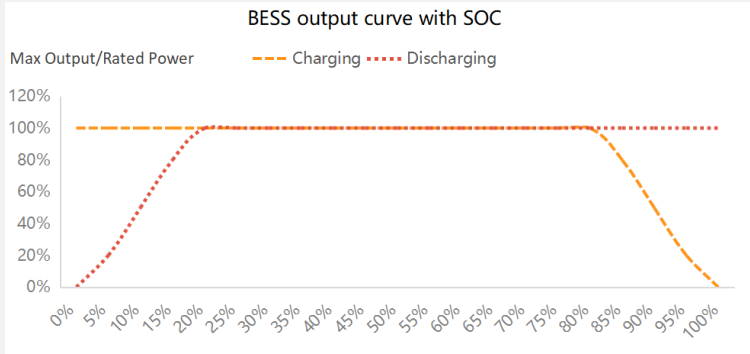
Electricity Energy Trading

CHS2 Perfect Match it

Smart Air Conditioning
Full Loading Operation in different external ambient temperature

Fast Response
Three-level topology + control algorithm to support fast response

Optimized Configuration
50kW/100kWh standard confi that support much longer time stanble full loading output



VPP Support for more flexible possibility

VPP: Aggregating residential PV batteries for participation

Energy Aggregators： 5+

evergen

lunar energy

FLOWER

DISCOVER ENERGY 第一能源

CheckWatt

Hardware solution

Local gateway of VPP

- High stability
- Quick response

Cloud to cloud solution

API

- Strong compatibility
- Rapid iteration
- Lower costs

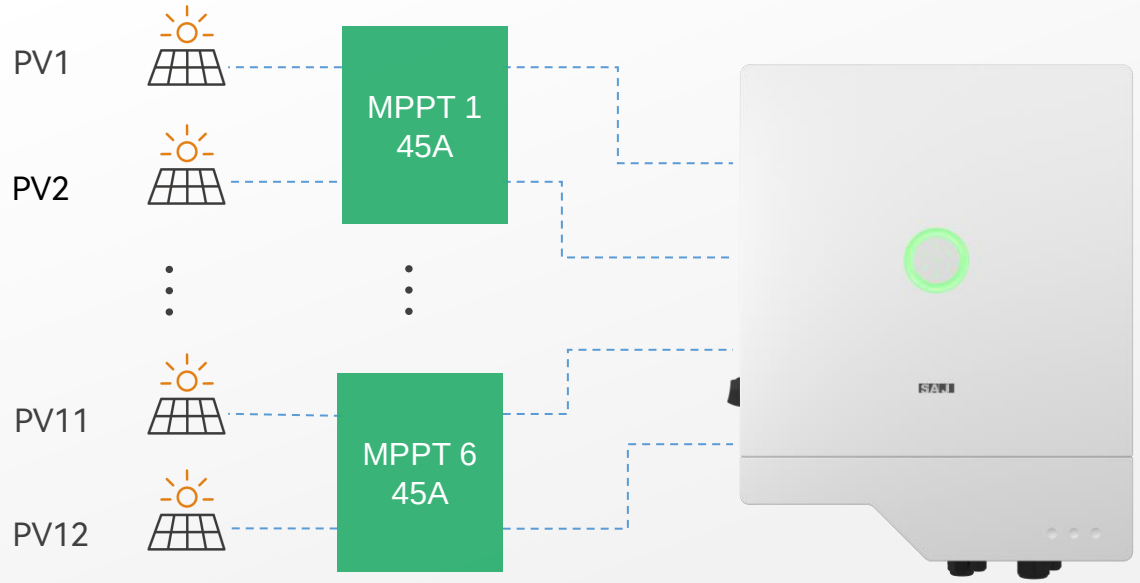
SAJ Open Platform

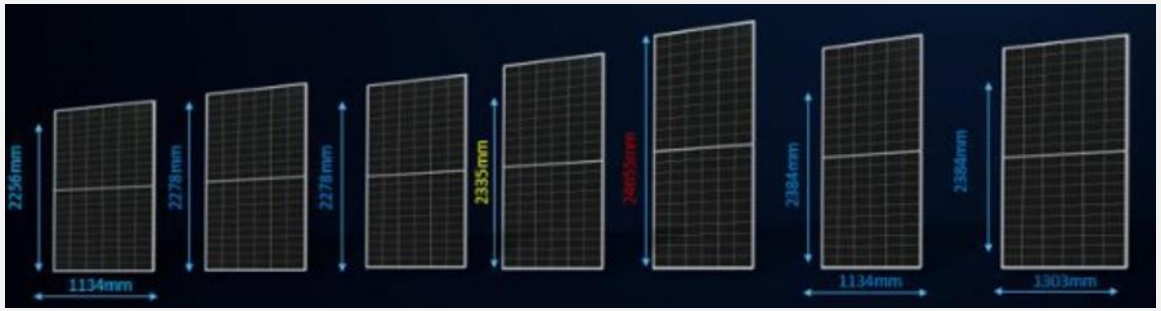
Larger PV Current Inputs and Winder MPPT Range for higher yield

Adapts to complex installation scenarios

- 6MPPT，200% PV oversizing
- 45A MPPT current
- Low starting-up voltage, wider MPPT voltage range (180-850V)

longer power generation time in rainy days and foggy areas.





One for All design

Match different size PV modules，Max 22.5A per PV string support

AFCI Integrated, Safe and Reliable

AFCI Support

AFCI reduces the risk of fire

AC and DC type II surge protection

ensures safer and more stable operation on inverter.

IP66 for CH2 inverter and IP55 for CHS2

IP66 protection, compact design, and IP68 fan intelligent air-cooling ensure high reliability and continuous operation of the inverter.

PV+

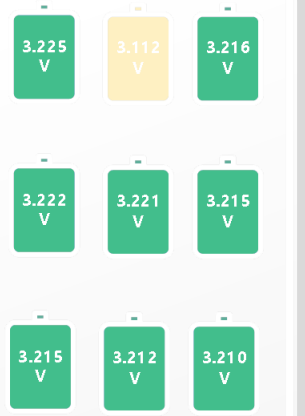
PV-

CB2-Battery System Safety Design

6 levels of active/passive fire protection to ensure the safety of customer's property.

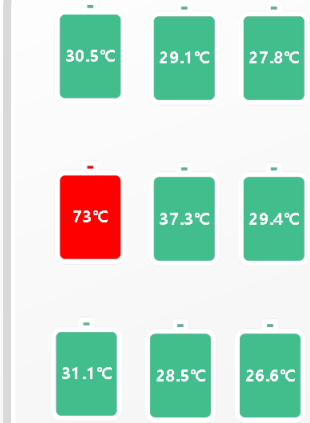
1

Core-level voltage sampling



2

Core-level temperature sampling



3

High Precision Sensors

CO Sensor

Smoke Sensor

Temperature and humidity sensors

Flood sensors

4

safety valve

5

Fire-fighting

Audible and visual alarms

Aerosol

6

Electrical safety

Positive and negative dual redundant contactors

Release switch

ALL IN ONE Desgin, Plug&Play

All Integrated Before Delivery

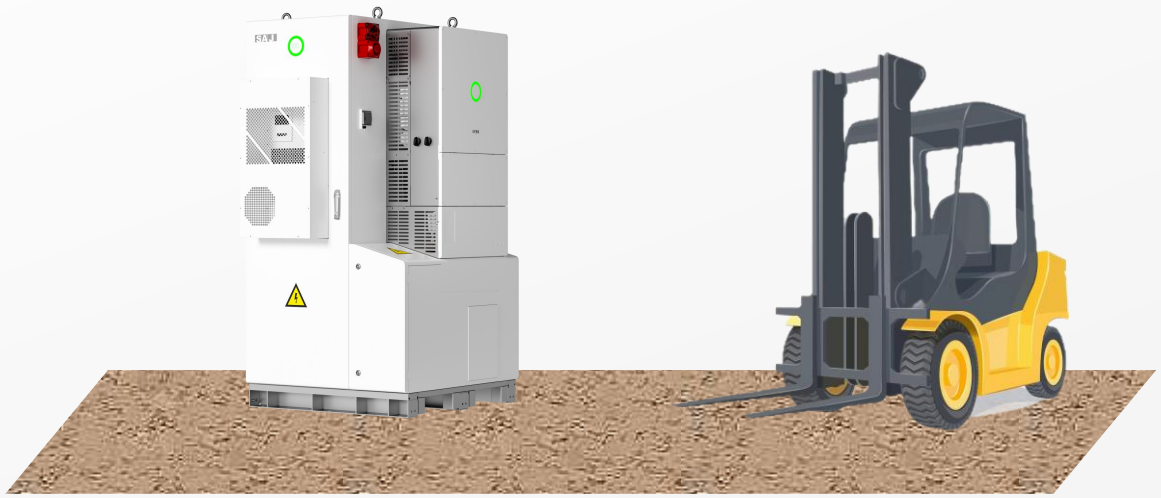
Pre-wiring to all components, minimize installation labor costs

Installation

Plug & Play installation on site with DC PV inputs and AC Outputs

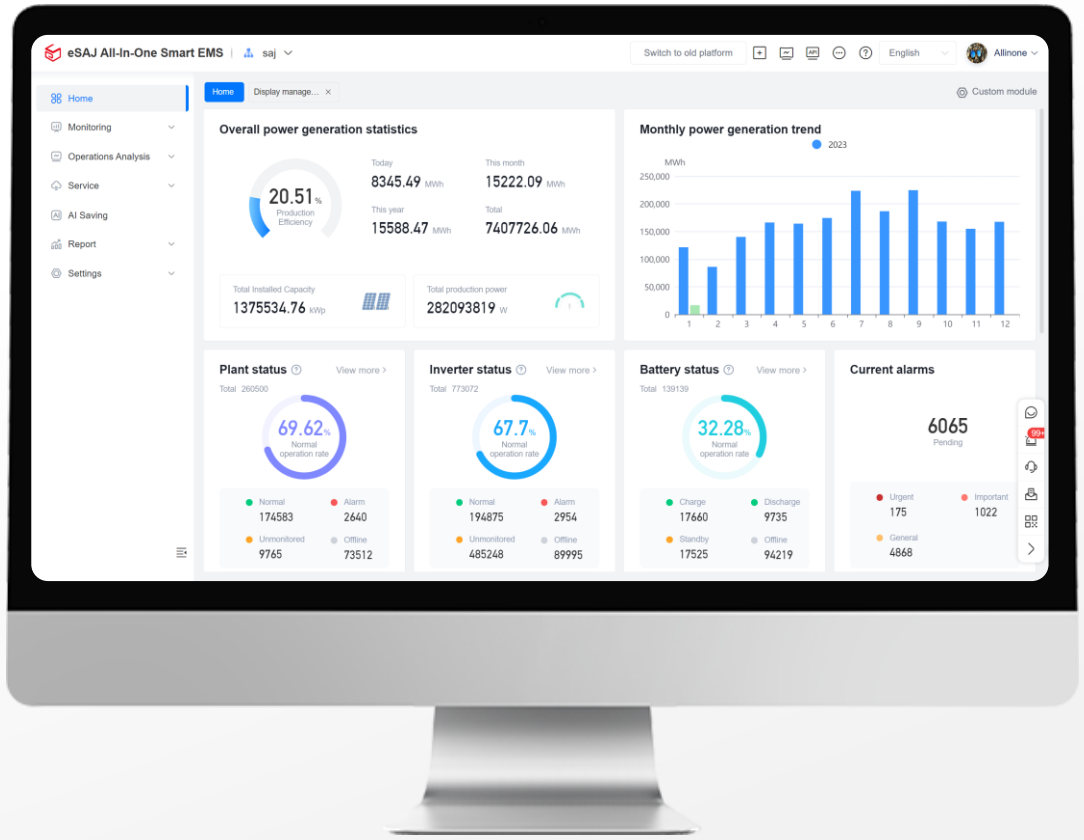
Requirement Space

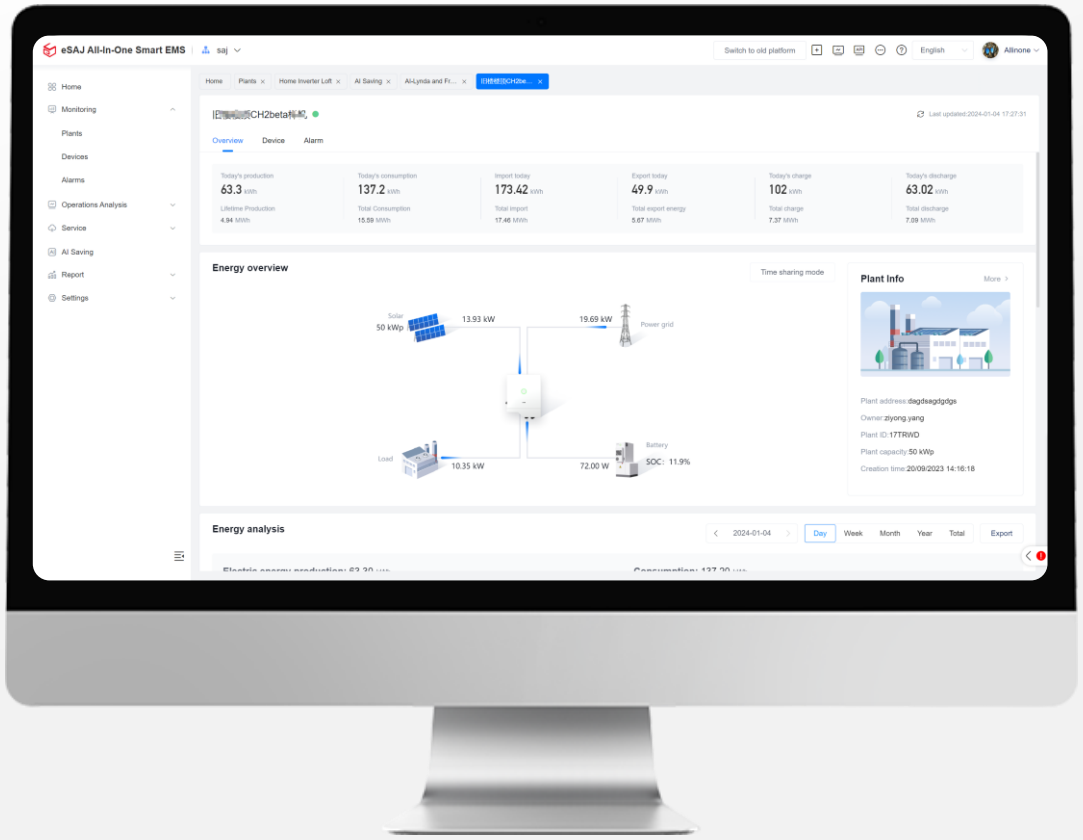
Compact structural design, flexible installation, and maximum utilization of on-site space



Smart Monitoring and Management System

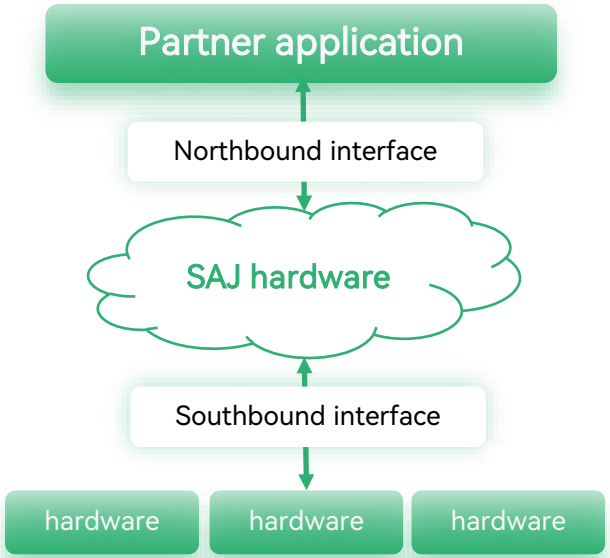
Plants	Devices	Alarms	Environment	Consumption	Other Data

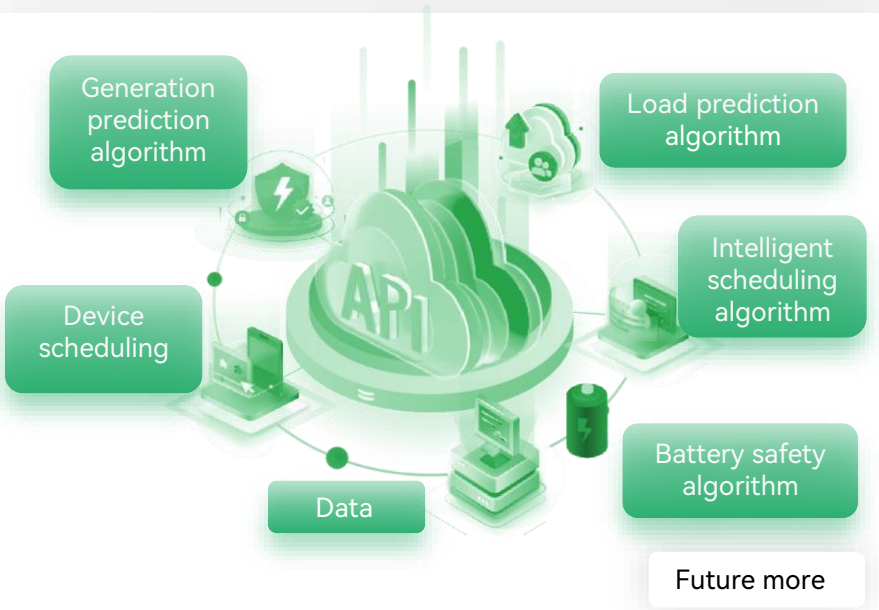




Open IoT Platform

API





Third-party energy operators

It provides access and control interfaces for energy devices. Energy operators, developers can obtain the ability to interact with energy devices to achieve energy operation scenarios.

Brand partner

Provide the interface of eSAJ Home smart energy management system and other business systems, partners as developers can obtain the ability to interact with the business system, and realize their own more business.

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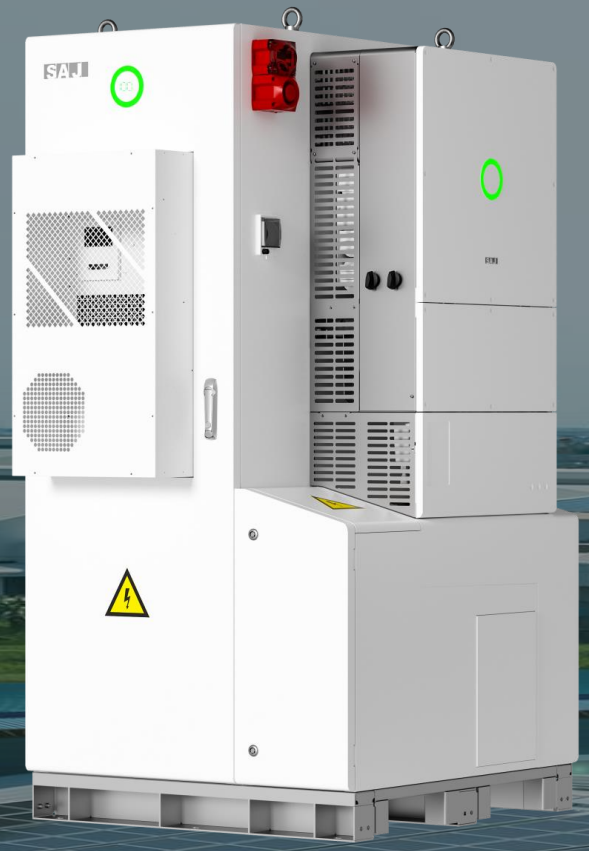
Smart All-In-One Hybrid Solution for C&I Scenarios



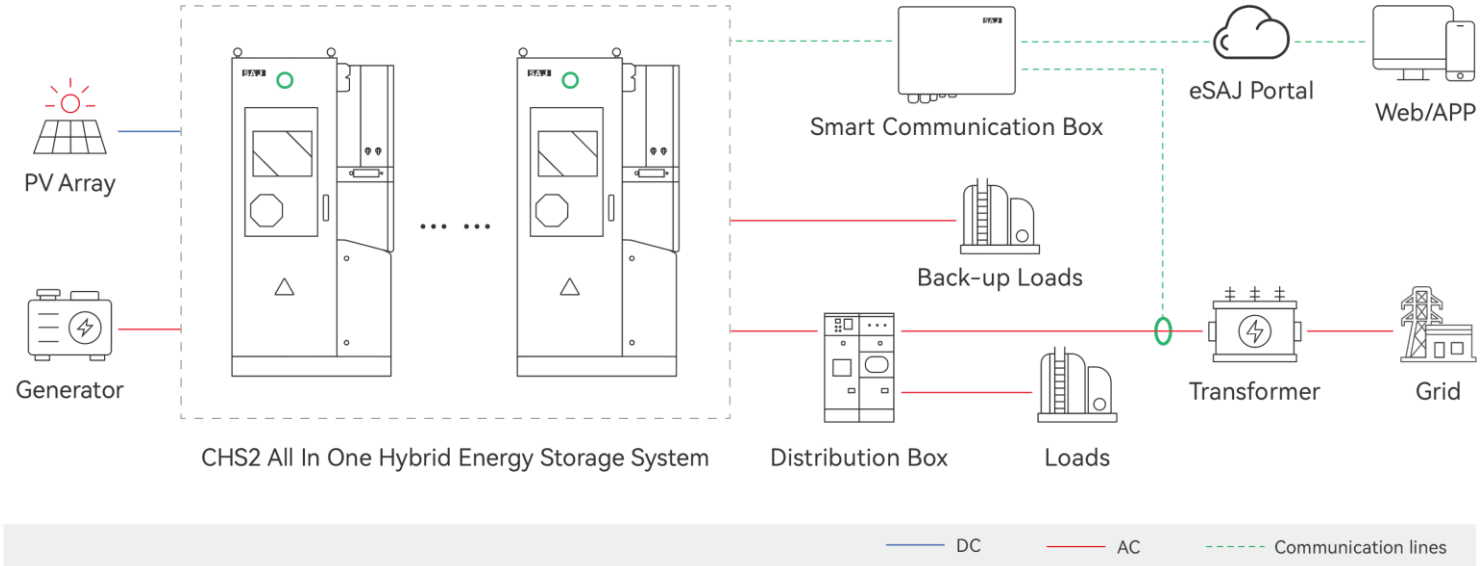
Multi Working Model Support

1. Self-Consumption
2. Zero Export
3. Back Up
4. Time of Use
5. Demand Control
6. Passive mode (for grid Auxiliary service)

Typical Application

1. DC coupling On/Off-Grid PV+ESS System
2. AC coupling System
3. Micro grid
4. Power Auxiliary Services (VPP)
5. Agrivoltaic+ESS system

DC Coupling On/Off-Grid PV+ESS System



A one-stop solution for solar power, storage, consumption, and backup power

The PV+ESS supports solar power, energy storage, and seamless switch between on-grid and off-grid operation, ensuring an uninterrupted power supply for users. During utility grid outages, through rapid and automatic switching to off-grid mode.

Working mode: Self-consumption / Backup power / Zero export

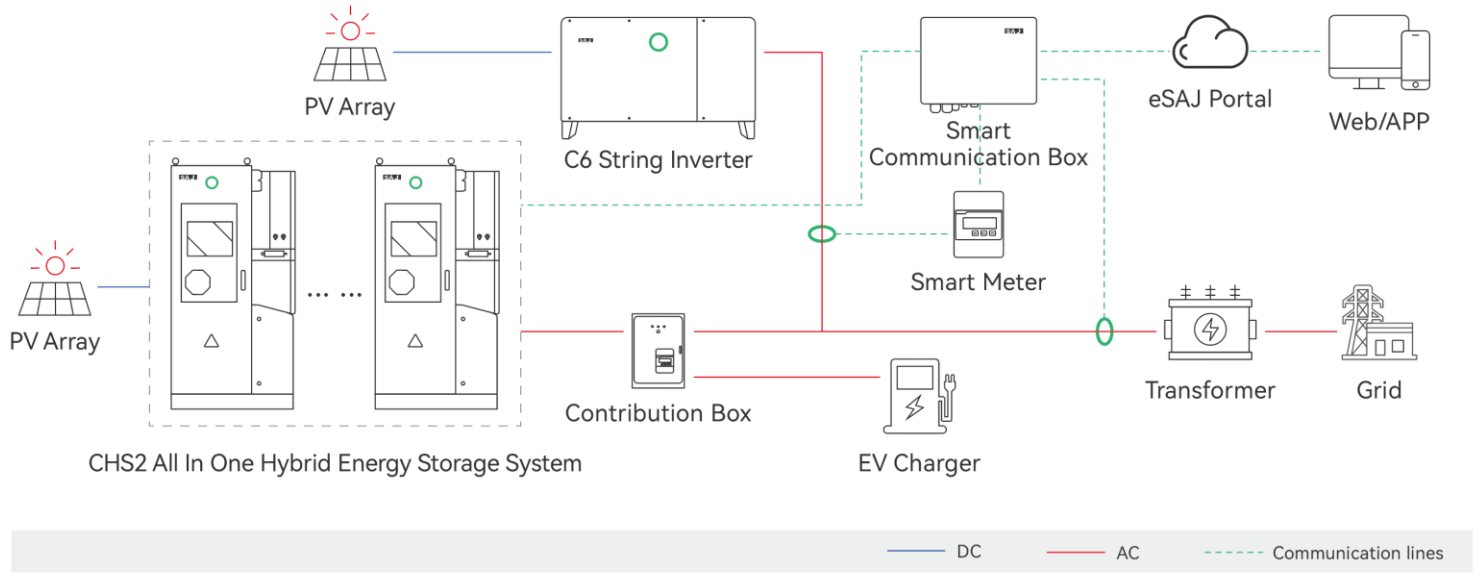
AC Coupling PV+ESS System

Grid congestion solution

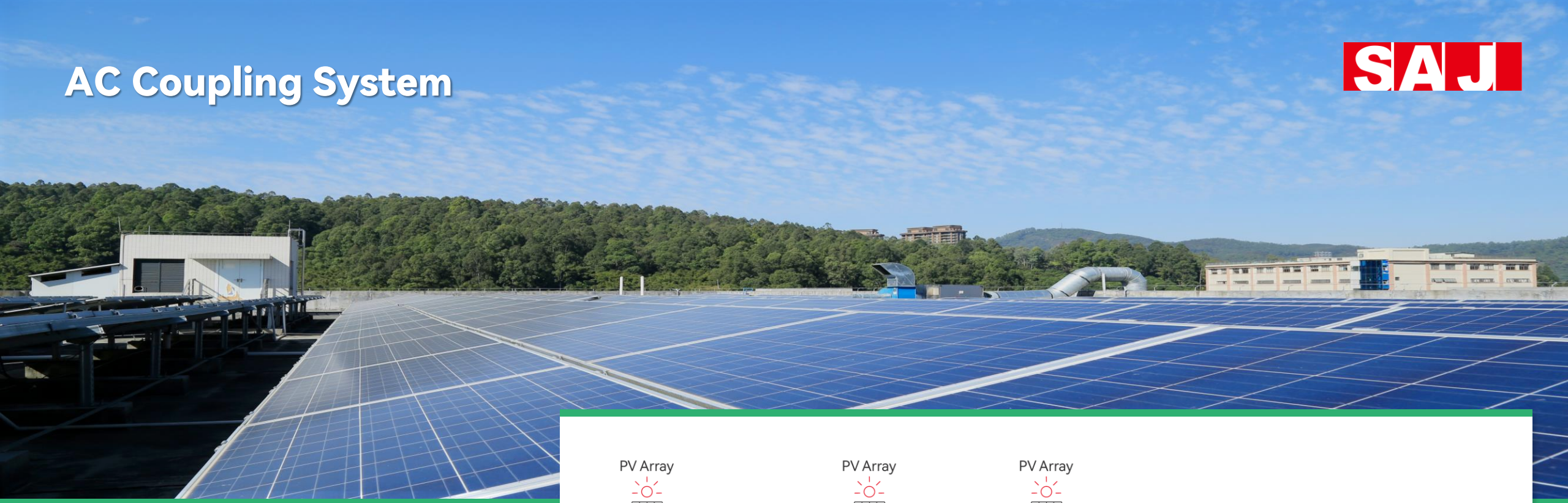
The CHS2 can be fed as a buffer by different sources.

With the EMS the energy sources can be controlled, but also the consumptions can be switched. For example, when there is a surplus of energy, it is made available to the battery charging. The ESS is AC-coupled with the **PV plants/ wind turbines station/CHP.**

Working mode: Self-consumption / Time of use / Demand Control



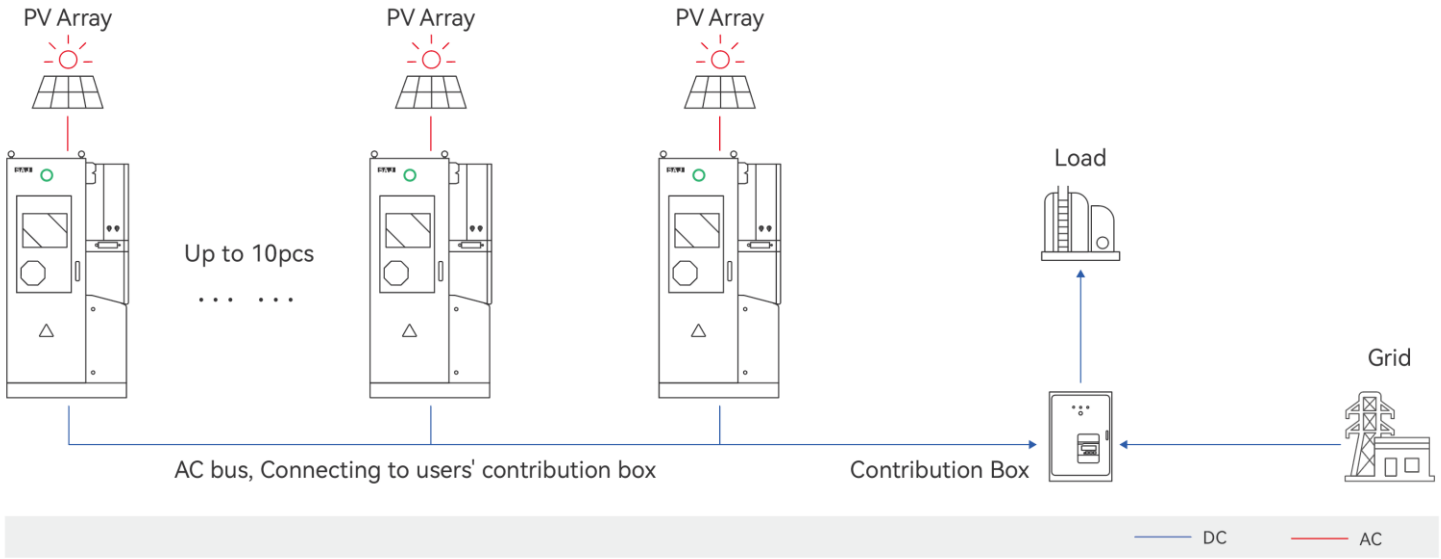
AC Coupling System



Grid congestion solution

Power boosting , for businesses unable to boost their grid connection power capacity, especially during peak hours, enlarge to a connection **(1~10)x 79.8A.** and a short-term overload current of **(1~10)x 108.75A (5s).** multiple batteries can be coupled to increase the capacity, covering **2h/4h/6h/8h peak hour demand.**

Working mode: Self-consumption / Time of use / Demand Control

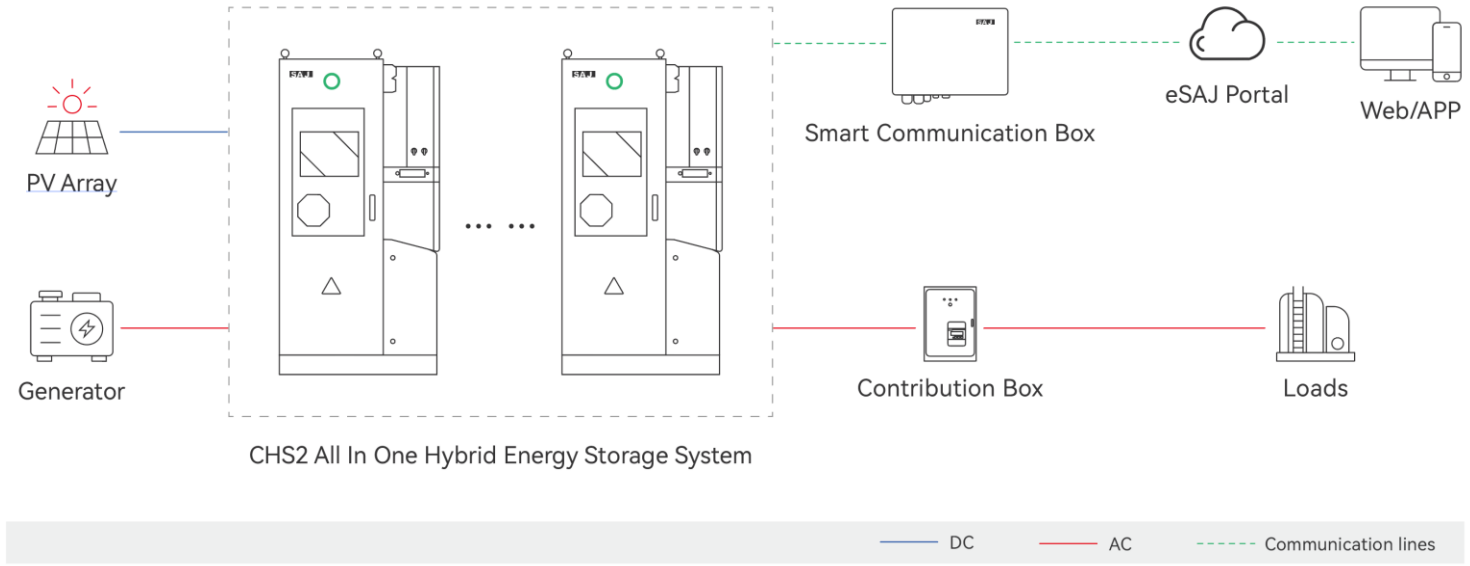


Mico-grid System

Reducing fossil energy consumption and lowering energy costs

In remote areas and on islands without electricity, this system is designed to provide power by coordinating and controlling the ESS ,PV, and DG (diesel generator). 100% three phase off-grid unbalanced output.

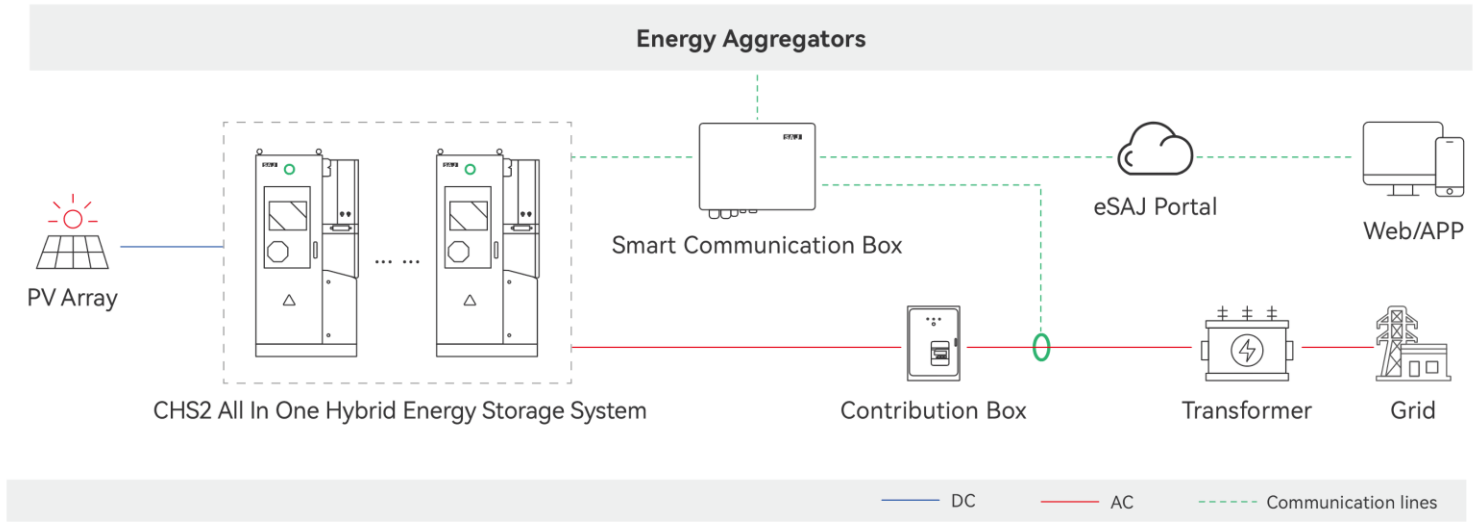
Working mode: Self-consumption



Power Auxiliary Services (VPP)

By connecting to a third-party energy trading platform or through VPP platforms eManager(EMS), eManager can receive and issue dispatch instructions, work with to provide frequency regulation sevice. Self-developed core devices, efficient fusion system, support for Intelligent temperature control system to meet the to ensure stable power output in adaptability in a wide range of temperature environments.

Working mode: Passive mode

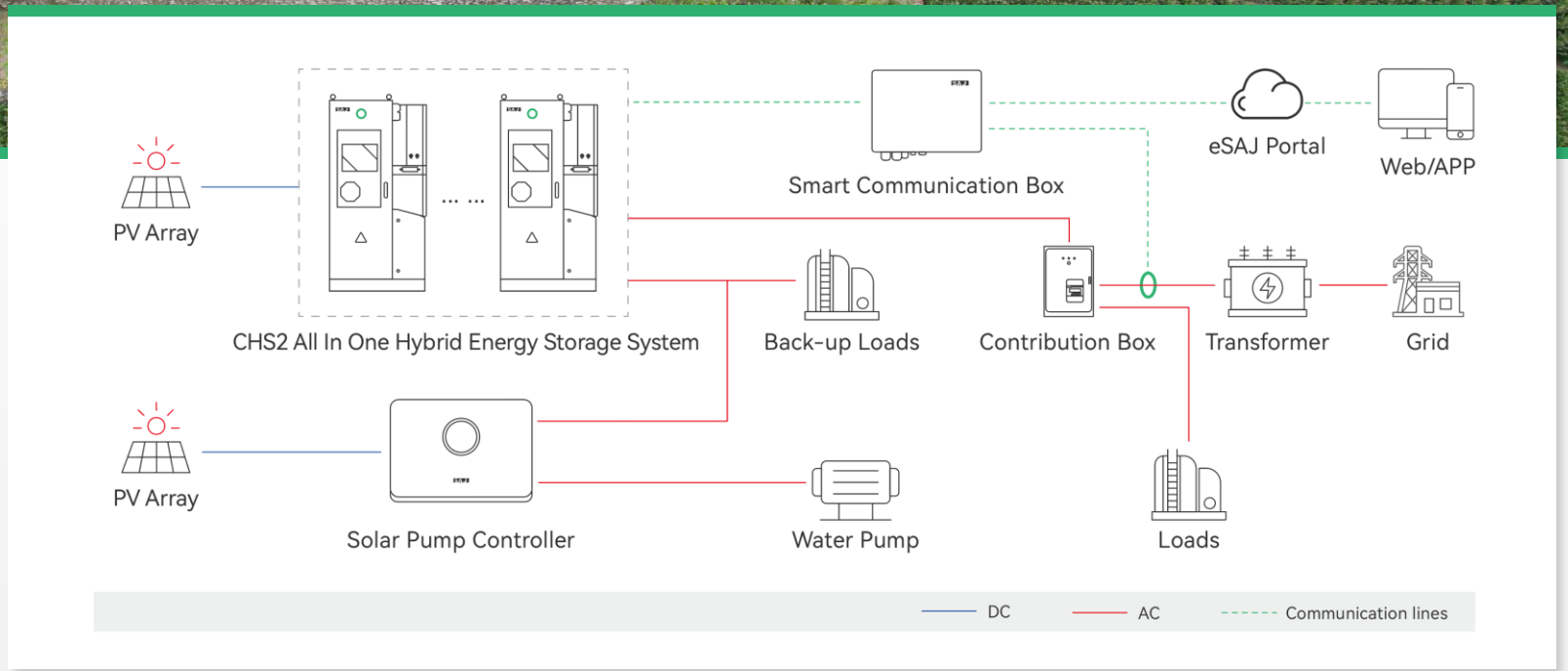


Agrivoltaic+ESS System

Complete solution including PV, ESS and solar water pump.

In areas with unreliable power grids, CHS2 solar storage systems ensure continuous power supply, even off-grid, crucial for protecting agricultural activities from power-related disruptions and financial losses. Empowering farmers with a complete range of renewable energy solutions.

Working mode: Self-consumption



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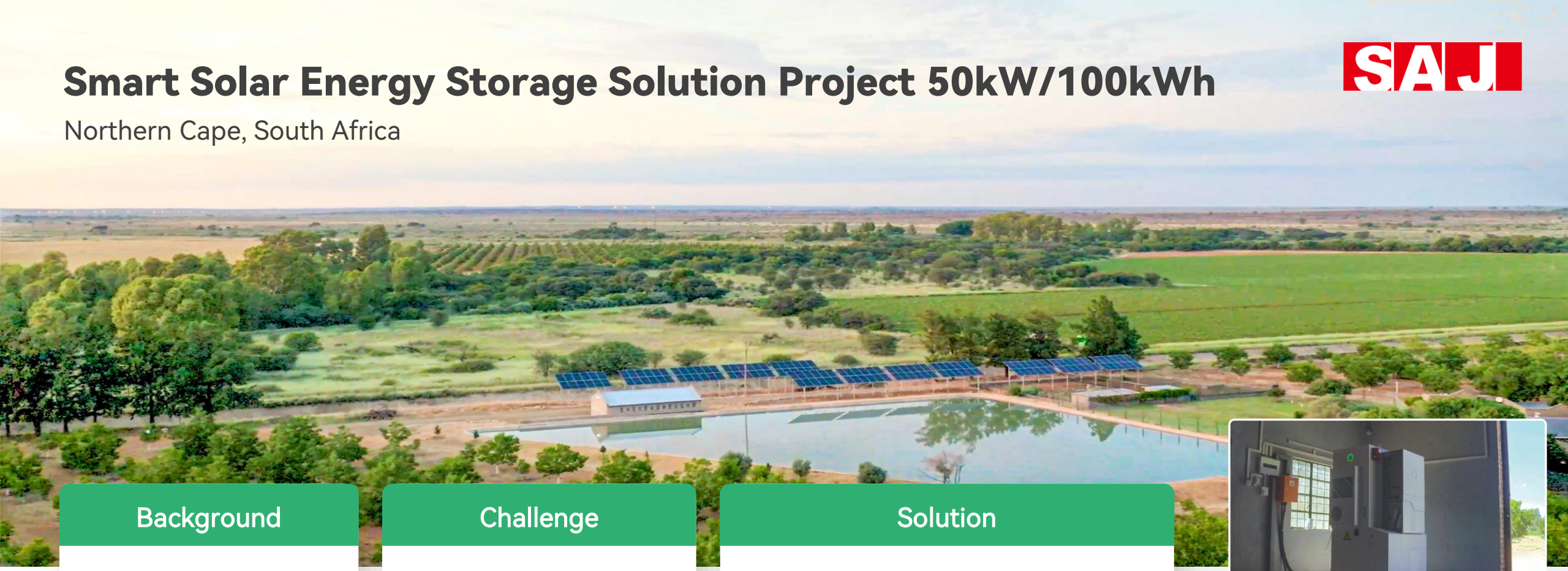
Smart Solar Energy Storage Solution Project 50kW/100kWh

Northern Cape, South Africa



Background

Nutlink Farm is a well-known agricultural establishment dedicated to the cultivation of pecan nut trees in South Africa. With 5,000 pecan nut trees under its care

Challenge

The farm encounters significant challenges during the harvest season. Load-shedding more than 1900hous in 2022 result in 65% pecan nut reduction

Solution

CHS2 solution enables simultaneous power supply and reduce reliance on the grid with a professional commercial energy storage system that includes 50% more photovoltaic modules than the industry average.

Annual power generated： **10MWh +**

Carbon reduced: **80+tons CO^2**

DC coupling PV+ESS project 50kW/100kWh

Melbourne, Australia

Background

The building serves as a warehouse for a solar energy company. There is a high volume of goods being transported through the warehouse every day. The busy operations result in an increasing demand for electricity.

Challenge

It requires a lot of energy to lift the heavy goods, for both morning and nighttime operations. However, a significant amount of solar power is wasted during midday.

Solution

The PV installation generates green electricity right on top of the building. The CHS2 solution ensures the best use of this power and also smooths the peak loads for the power drawn from the grid.

THANK YOU

Revolutionize Energy Storage Solutions

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SAJ