



WIT+AXE Hybrid Energy Storage System Introduction

Preliminary Version



SHENZHEN GROWATT NEW ENERGY CO.,LTD

Overseas Marketing Department

GROWATT

2024 V1.1



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To Build the World's Largest

Intelligent Sustainable Energy Ecosystem for Human Kind

NO.1 User Side Storage Inverter Company

F R O S T & S U L L I V A N

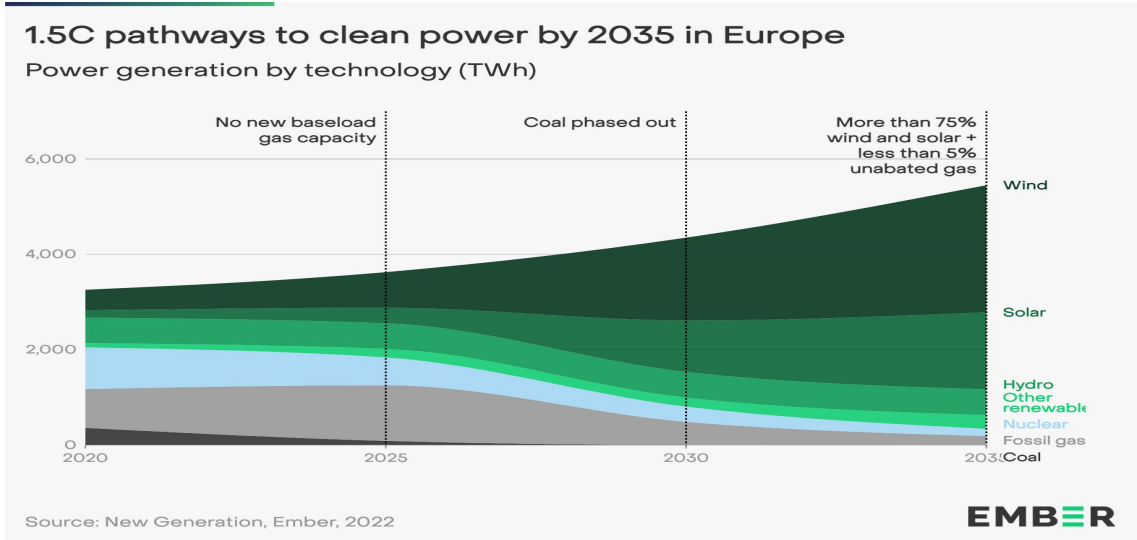
Based on the report of Frost & Sullivan, GROWATT is the world's largest supplier of user-side energy storage inverter in terms of shipment volume.

01

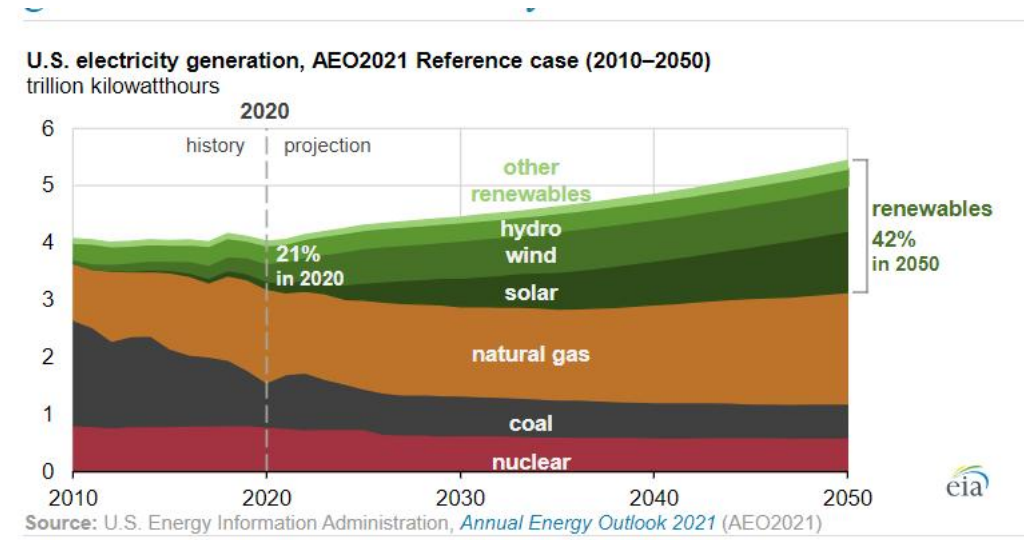
General Introduction



Renewable Energy Becomes the Main Body of Future Power Generation



From: New Generation, Ember

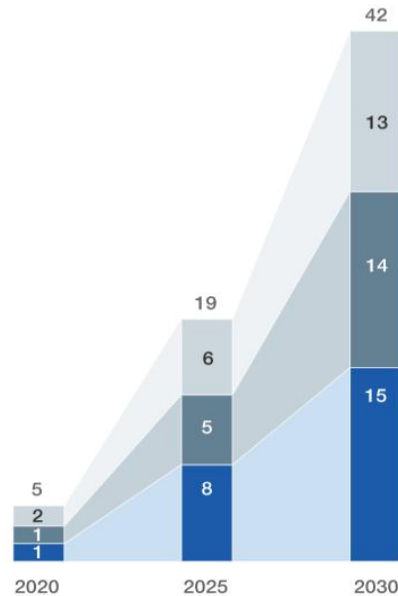


From: US Energy Information

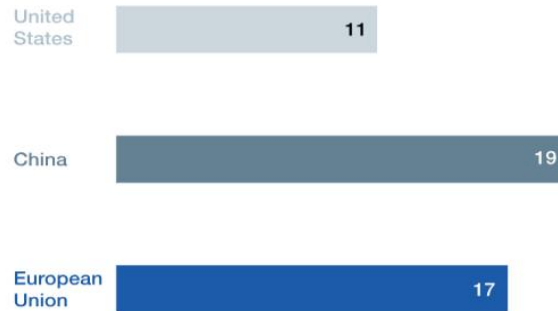
- New Generation predicts that in 2025, new energy generation will account for about 25%, and in 2050, new energy generation will account for 75% in Europe
- US Energy information predicts that in 2020, new energy generation will account for about 21%, and in 2050, new energy generation will account for 42% in US

High Voltage Fast Charging Becomes the Trend of Charging Station

Estimated number of chargers,¹
million



Estimated capital investment,
\$ billion



¹Figures may not sum, because of rounding.

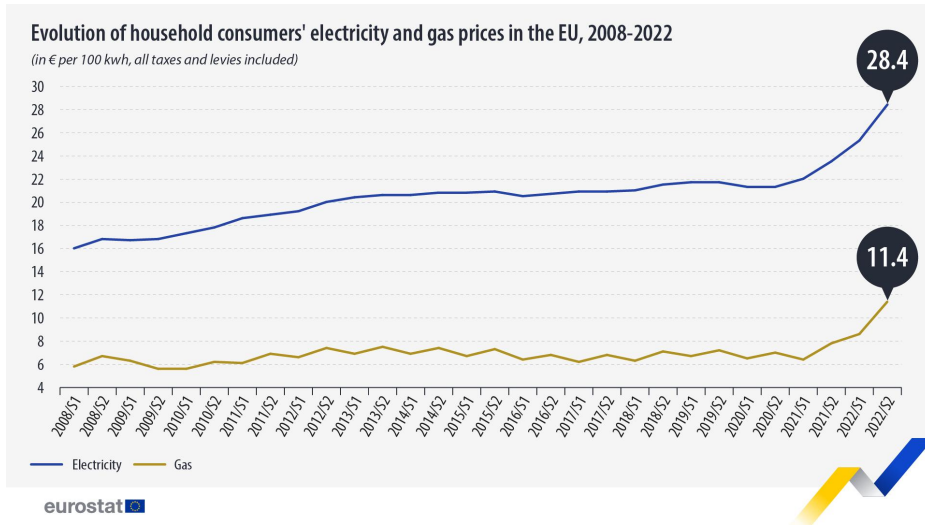
McKinsey&Company

- McKinsey & Company estimates global EV chargers will increase to **19 millions** in 2025, and **42 millions** in 2030 with **\$47B revenue**.



- According to IEA estimates, there will be **5.5 million** public fast charging stations by 2030, and the electricity demand for charging by 2030 may exceed **750TWh**.
- Charging voltage increased from **400V to 800V**, Charge for **5min** and drive for **200km**

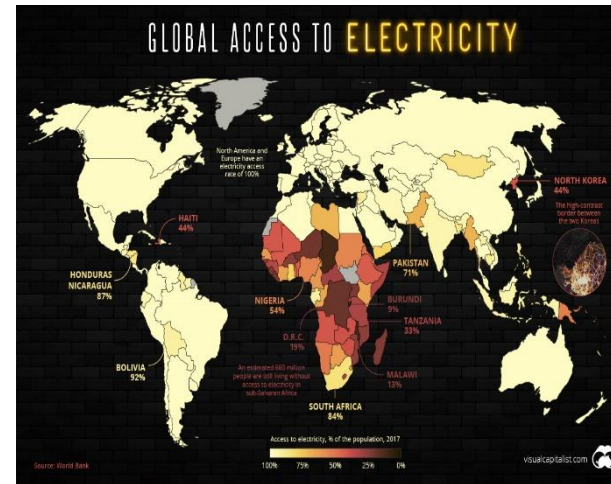
Higher energy price, higher electricity bill



From: EUROSTART Report

- According to eurostart report, consumer prices for electricity and gas price averagely increased by **18.3%** and **42%** between 2021 and December 2022.

Without access to electricity



From: World Bank

- According to world bank data, Estimated **1.2 billion** people live without access to electricity. People still living in dark, what are they suffering?

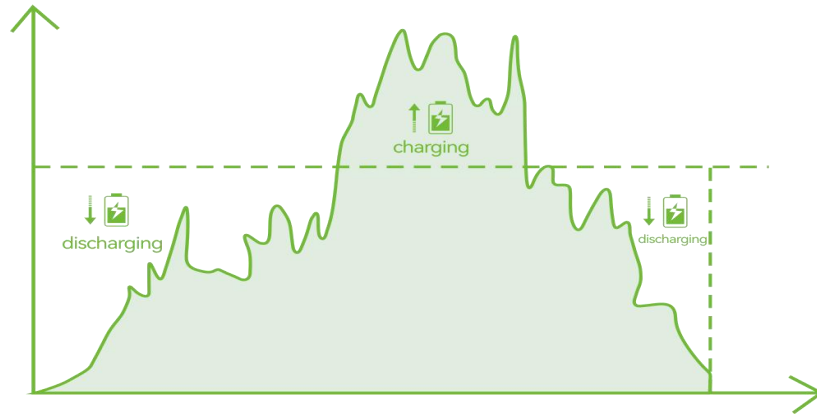


02

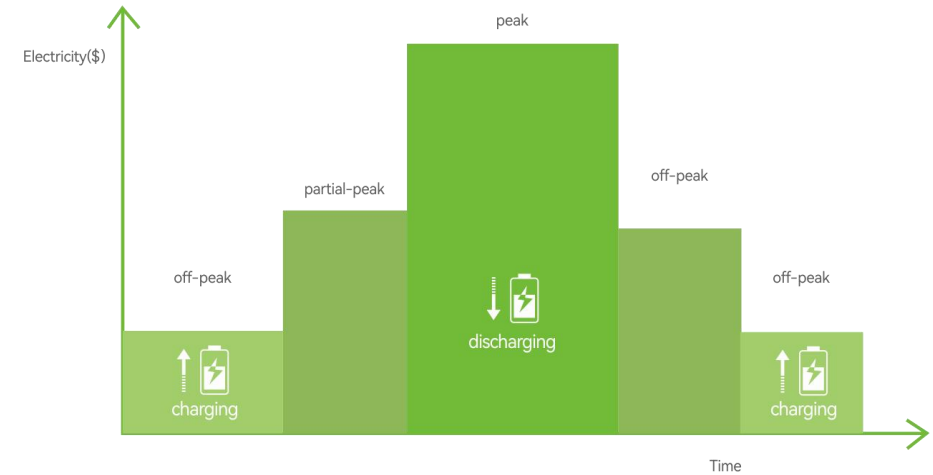
Multiple Applications and Solutions



- **Self-Consumption:** Storing the surplus solar power into the battery during the day and using it at night, which maximizes the solar energy self-consumption rate.



- **Time of Use:** Charge the battery at off-peak tariff and use it at peak tariff to reduce the electricity bill.



Commercial Scenarios



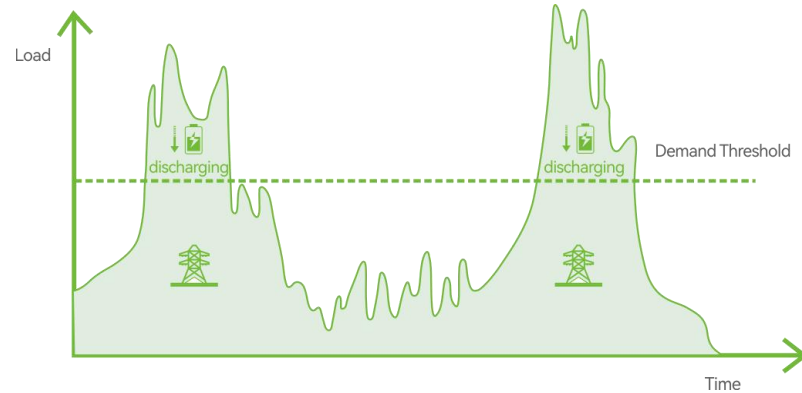
Industry Scenarios



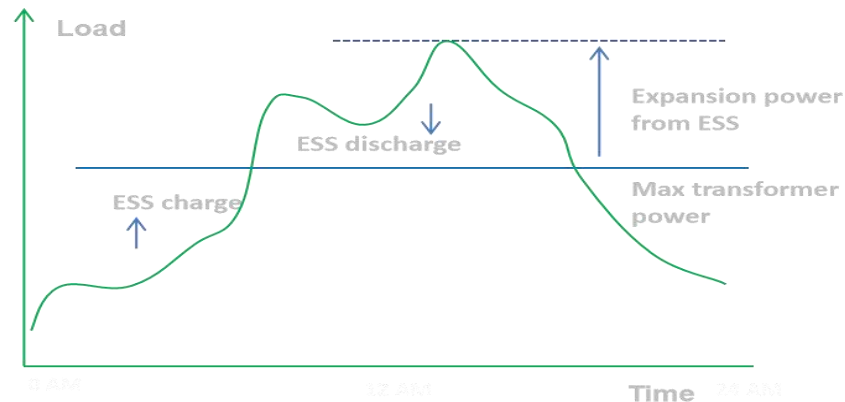
Micro-Grid Scenarios



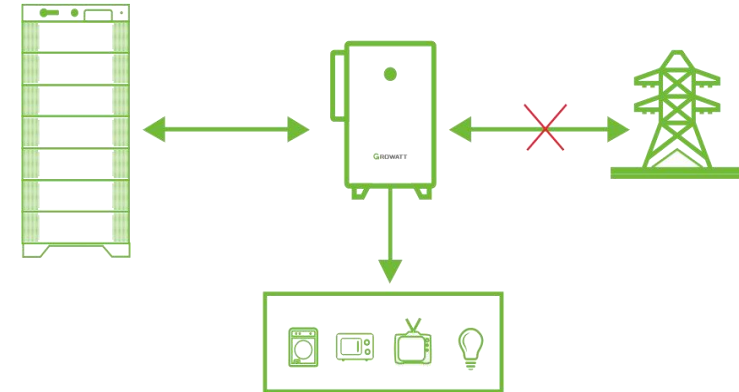
- **Demand Charge:** The battery will discharge to offset portions of the load consumption beyond the power demand threshold to reduce the electricity bill.



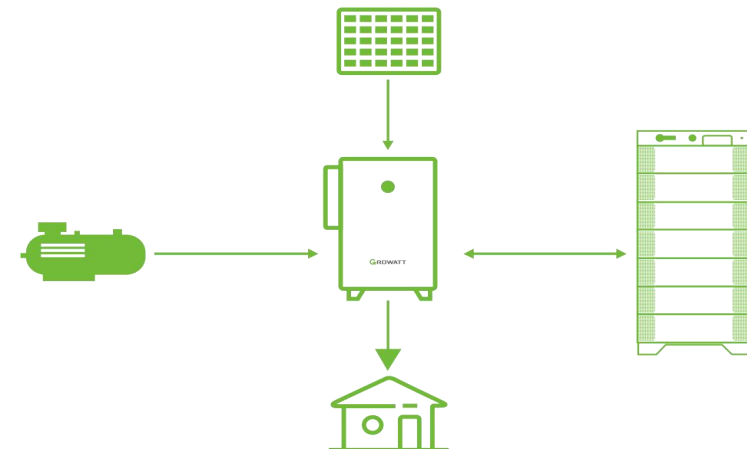
- **Power Expansion:** The battery will discharge to compensate for the additional load consumption when the load power exceeds the transformer capacity.



- **Backup Power:** The energy storage system as a backup power will supply power to the load when the power grid fails.



- **Micro-grid:** Work with multiple energy source to guarantee 24/7 power supply where there is no grid.



Commercial & Industry ESS Solution



Hybrid Inverter
WIT 29.9-50K-XHU



Commercial Battery
AXE 30-60H-CE1/RE1



All-in one ESS
WIT 30-50kW/60kWh

03

WIT+AXE System Introduction





WIT Hybrid Inverter



AXE Commercial Battery

WIT+AXE System

- **Nominal Output Power:** 29.9/30/35/40/50kW
- **Nominal AC Voltage:** 380/400V,
- **Nominal AC Frequency:** 50/60Hz
- **Battery Energy:** Max 3 battery cabinet (30-60kWh for single cabinet)
- **PV Input Power:** 2 nominal power
- **AC Grid Connection Type:** 3P3W+PE/3P4W+PE
- **Ingress Protection:** IP66 (for hybrid inverter) /IP20 (for battery cabinet)
- **Working Mode:** On-grid and off-grid mode
- **On/Off Switching Time:** < 10ms
- **Installation Method:** Indoor Cabinet (battery) , Wall-mounted (Inverter)
- **Parallel System for Inverter :** 6 sets (in-grid mode), 3 sets(off-grid mode)



WIT 30-50K+AXE 60H-TE1

WIT+AXE System

- **Nominal Output Power:** 29.9/30/35/40/50kW
- **Nominal AC Voltage:** 380/400V,
- **Nominal AC Frequency:** 50/60Hz
- **Battery Energy:** 60kWh
- **PV Input Power:** 2 nominal power
- **AC Grid Connection Type:** 3P3W+PE/3P4W+PE
- **Ingress Protection:** IP55
- **Working Mode:** On-grid and off-grid mode
- **On/Off Switching Time:** < 10ms
- **Installation Method:** Outdoor Cabinet

◆ Flexible Configuration

- Hybrid/Storage Inverter: 29.9/30/35/40/50kW,
- Battery system: 30~60kWh(single inverter) , Max 3 battery cabinet for single WIT inverter
- Up to 3 pcs WIT inverter in parallel operation in off-grid mode, 6 system in on-grid mode

◆ Flexible deployment

- Supports distributed or centralized deployment
- Supports battery cabinet deployment at different times
- Supports battery cabinet deployment with different capacity

◆ Safe and Reliable

- Superior safety using cobalt-free LFP battery
- Multi-level protections from Inverter, battery system
- Bulit-in aerosol in each battery pack(Opt)

◆ Smart Management

- Supports local display and remote monitoring
- Remote firmware upgrade and lifespan smart online service
- Grid-support functions

The WIT hybrid inverter supports indoor and outdoor installation, and the AXE commercial battery cabinet needs to be installed indoors.

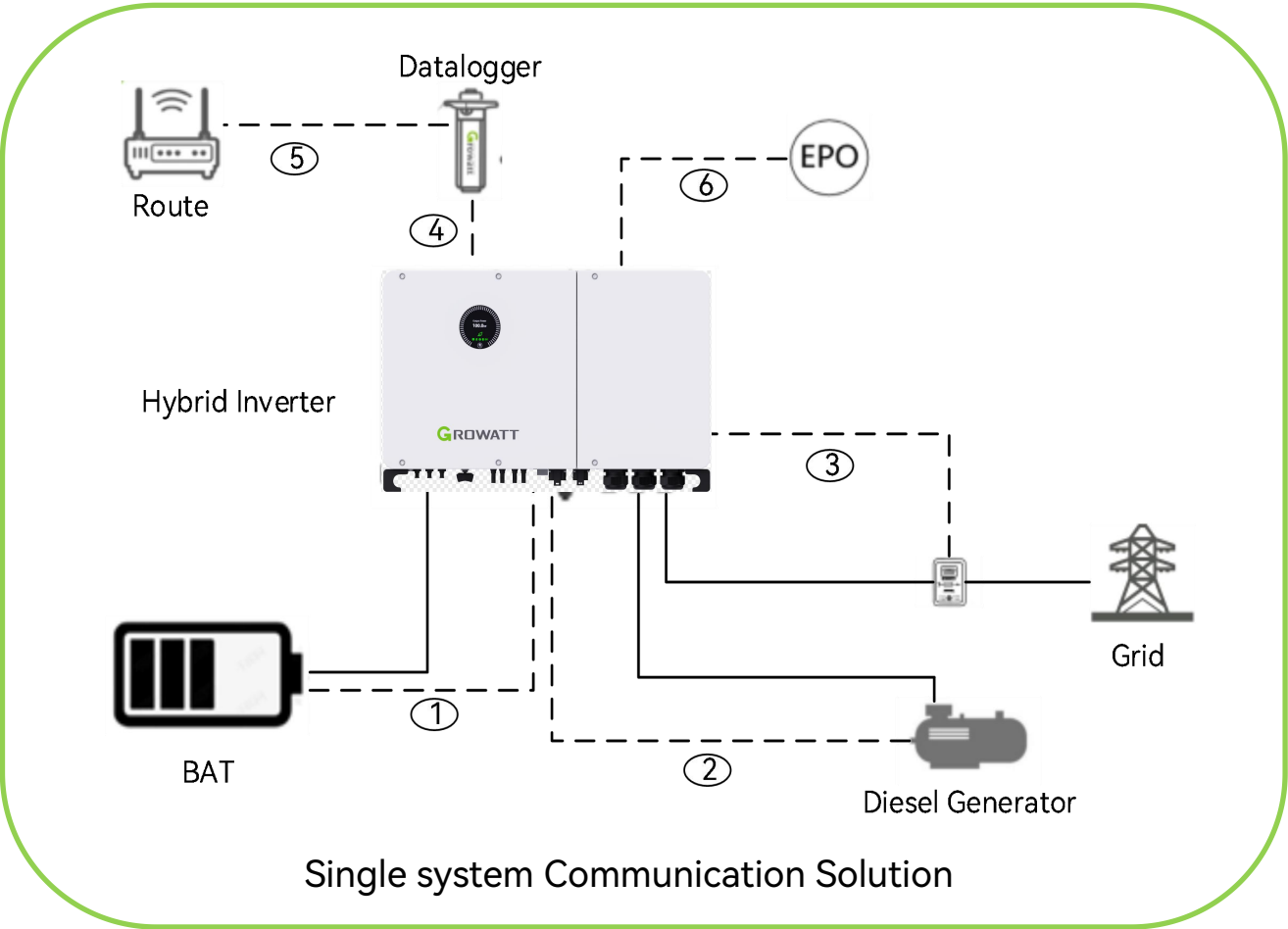


Single WIT with Three Battery Cabinet



Three WIT in Parallel with Nine Battery Cabinet

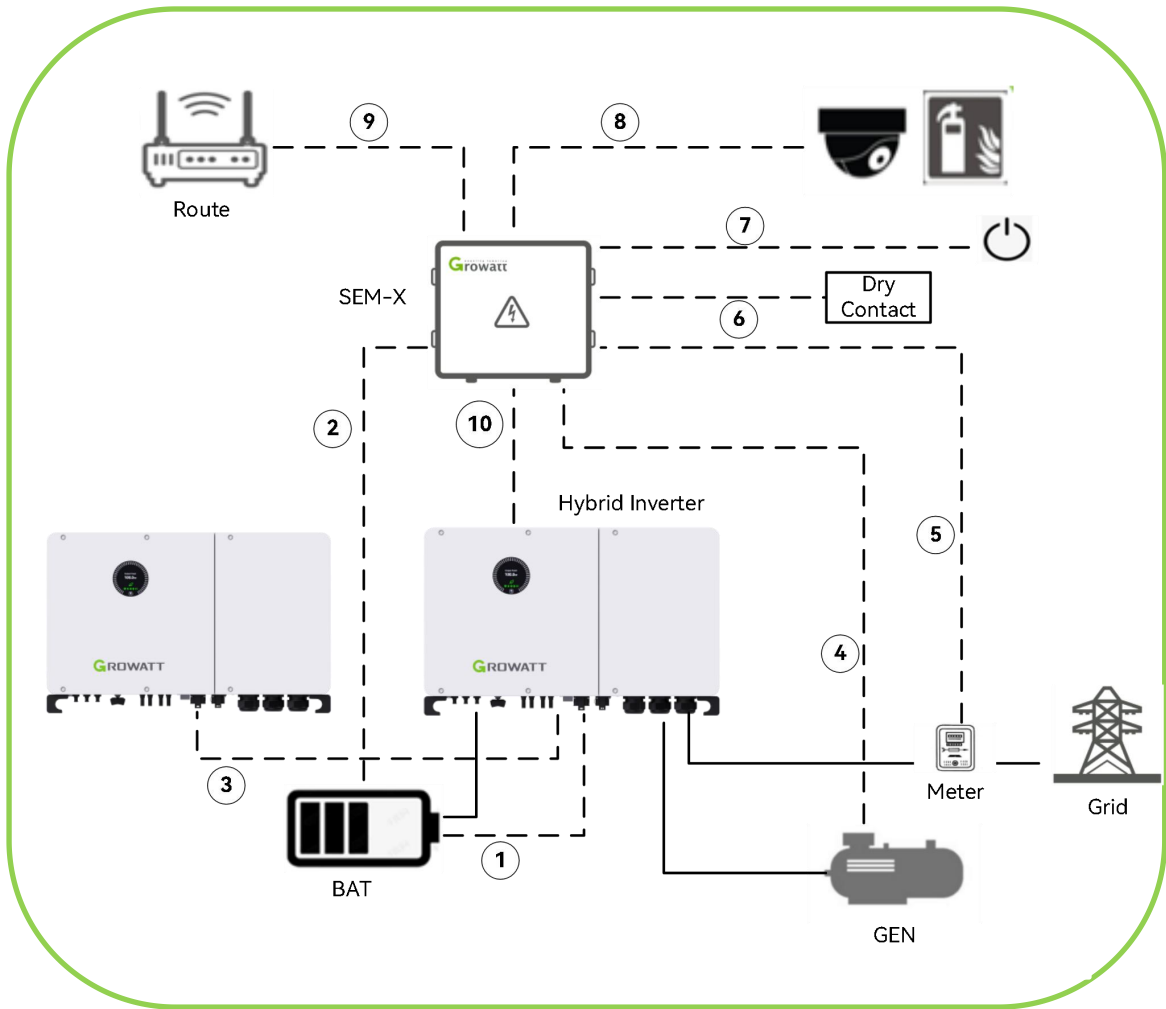
Single System Communication Topology



Datalogger supports ShineWiLAN-X2

No	Communication	Connection	Function
①	CAN/RS485	Hybrid inverter and Battery	Battery system communication and control
②	Dry Contact	Hybrid inverter and Generation	Generator start up and stop
③	RS485	Hybrid inverter and Smart meter	Power flow information and export limit function
④	USB/RS485	Datalogger and hybrid/storage inverter	Acquire the whole system information without all battery cell information
⑤	LAN/WIFI	Network	Local or Cloud Platform connection
⑥	Dry Contact	EPO	Emergency Stop

Multiple System Communication Solution



No	Communication	Connection	Function
①	CAN/RS485	Inverter and battery	Battery system communication and control
②	RS485	EMS and Battery	Battery system control and battery data acquisition, Function reserved
③	RS485/CAN	Inverter and inverter	Communication between inverter and inverter
④	Dry Contact	SEM-X and GEN	Generator start up and stop
⑤	RS485	SEM-X and Smart Meter	Power flow information and export limit function
⑥	Dry Contact	SEM-X Extended port	Dry Contact Control
⑦	DO	SEM-X Control	Function reserved
⑧	DI	SEM-X Control	Emergency stop, security and protection, Fire protection
⑨	LAN	EMS and Internet	Local or Cloud Platform connection
⑩	RS485	Inverter and SEM-X	Acquire the whole system information

System Options

System Option					
AXE 60.0H-E1*3(184.32kWh)	√	√	√	√	√
AXE 50.0H-E1*3(153.6kWh)	√	√	√	√	√
AXE 40.0H-E1*3(122.88kWh)	√	√	√	√	√
AXE 35.0H-E1*3(107.52kWh)	√	√	√	√	√
AXE 30.0H-E1*3(92.16kWh)	√	√	√	√	√
AXE 60.0H-E1*2(122.88kWh)	√	√	√	√	√
AXE 50.0H-E1*2(102.4kWh)	√	√	√	√	√
AXE 40.0H-E1*2(81.92kWh)	√	√	√	√	√
AXE 35.0H-E1*2(71.68kWh)	√	√	√	√	√
AXE 30.0H-E1*2(61.44kWh)	√	√	√	√	√
AXE 60.0H-E1*1(61.44kWh)	√	√	√	√	√
AXE 50.0H-E1*1(51.2kWh)	√	√	√	√	√
AXE 40.0H-E1*1(40.96kWh)	√	√	√	√	Limited(Max 40kW)
AXE 35.0H-E1*1(35.84kWh)	√	√	√	Limited (Max 35kW)	
AXE 30.0H-E1*1(30.72kWh)	√	√	Limited (Max 30kW)		
	WIT 29.9K-XHU	WIT 30K-XHU	WIT 36K-XHU	WIT 40K-XHU	WIT 50K-XHU

(1) Labeled with “√ ” means the system can have a full load AC output when only battery, and labeled with “Limited” means the AC max output of the system with cosrresponding battery system.

(2) System will be ready in Q3, 2024

System Components

For Single System			
Product Type	Product Model Name	Product Information	Note
Battery Cabinet	AXE 30-60H-R/C/TE1	30/35/40/50/60kWh for single battery cabinet	Max 3 pcs battery cabinet for single hybrid inverter
Hybrid Inverters	WIT 29.9-50K-XHU	29.9/30/35/40/50kW for single hybrid inverter	
Datalogger	Datalogger	ShineWiLAN-X2	The hybrid inverter is equipped with WiLAN module as standard
Smart Meter	TPM-CT-C-EU/TPM-CT-E-EU	250/5A, 600/5A, 1200/5A	Single sytem application, select different CT according to needs
For Multiple System In Parallel			
Product Type	Product Model Name	Product Information	Note
Battery Cabinet	AXE 30-60H-R/C/TE1 * N	30/35/40/50/60kWh for single battery cabinet	Max 3 pcs battery cabinet for single hybrid inverter
Hybrid Inverters	WIT 29.9-50K-XHU	29.9/30/35/40/50kW for single hybrid inverter	Max 3 pcs in parallel in off-grid mode
Monitoring Device	SEM-XA-RM	Smart energy management, used for local or cloud platform connection and complex applications	Multiple system application, include meter, CT needs to be ordered separately for procurement
CT	CT	250A/600A/1200A/2000A	Select different CT according to needs

Remark: For a single system, if detailed cell data in the battery cabinet is required, SEM-X is recommended

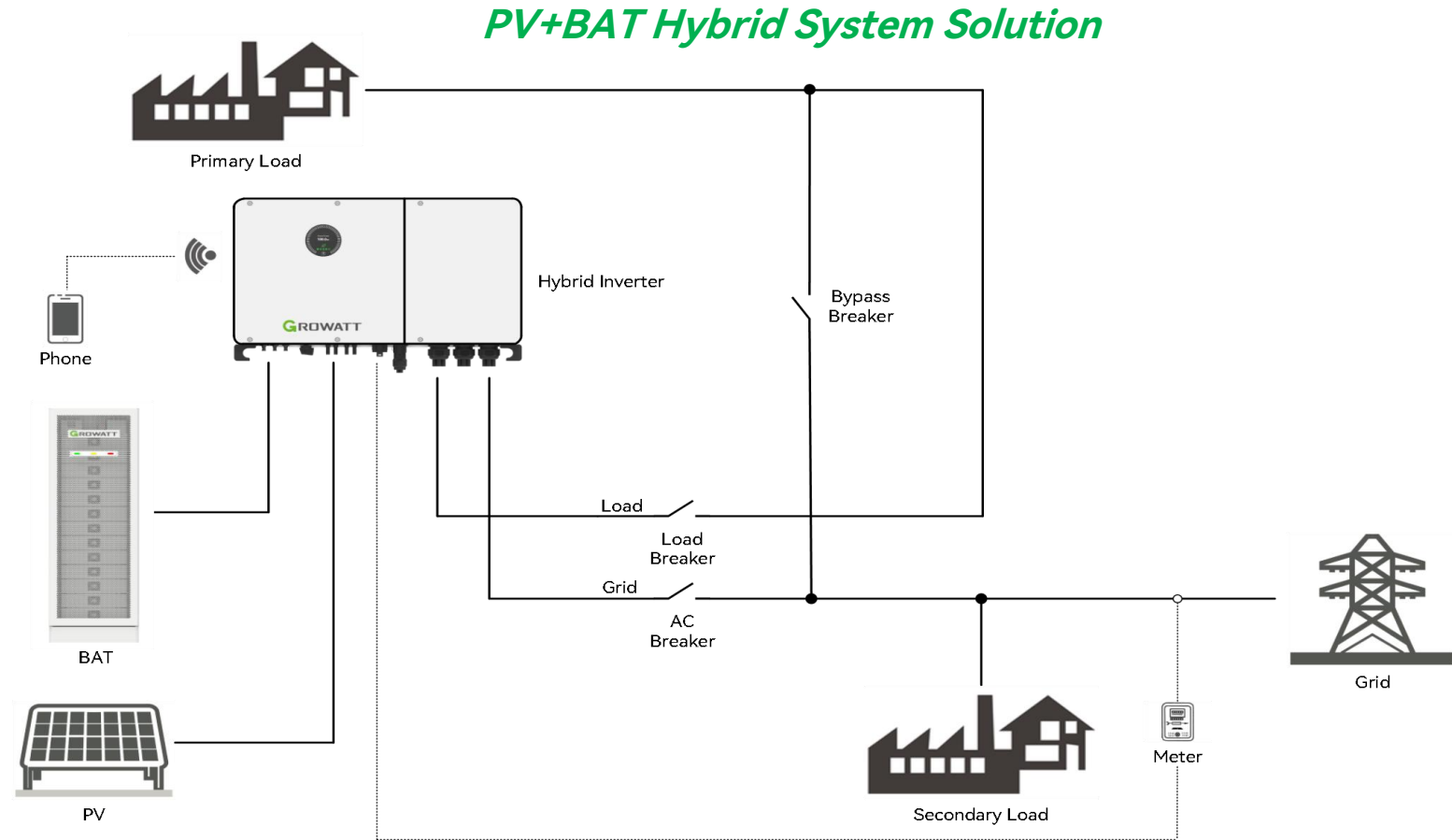
Recommended Solution for C&I Application Scenarios

Application Scenario:

1. Relative stable grid, without diesel generator
2. Available for solar installation
3. Need backup for crucial loads

Solution Benefit:

- Maximize solar energy self-consumption
- Ensure continuous operation of critical loads
- Reduce electricity cost for users



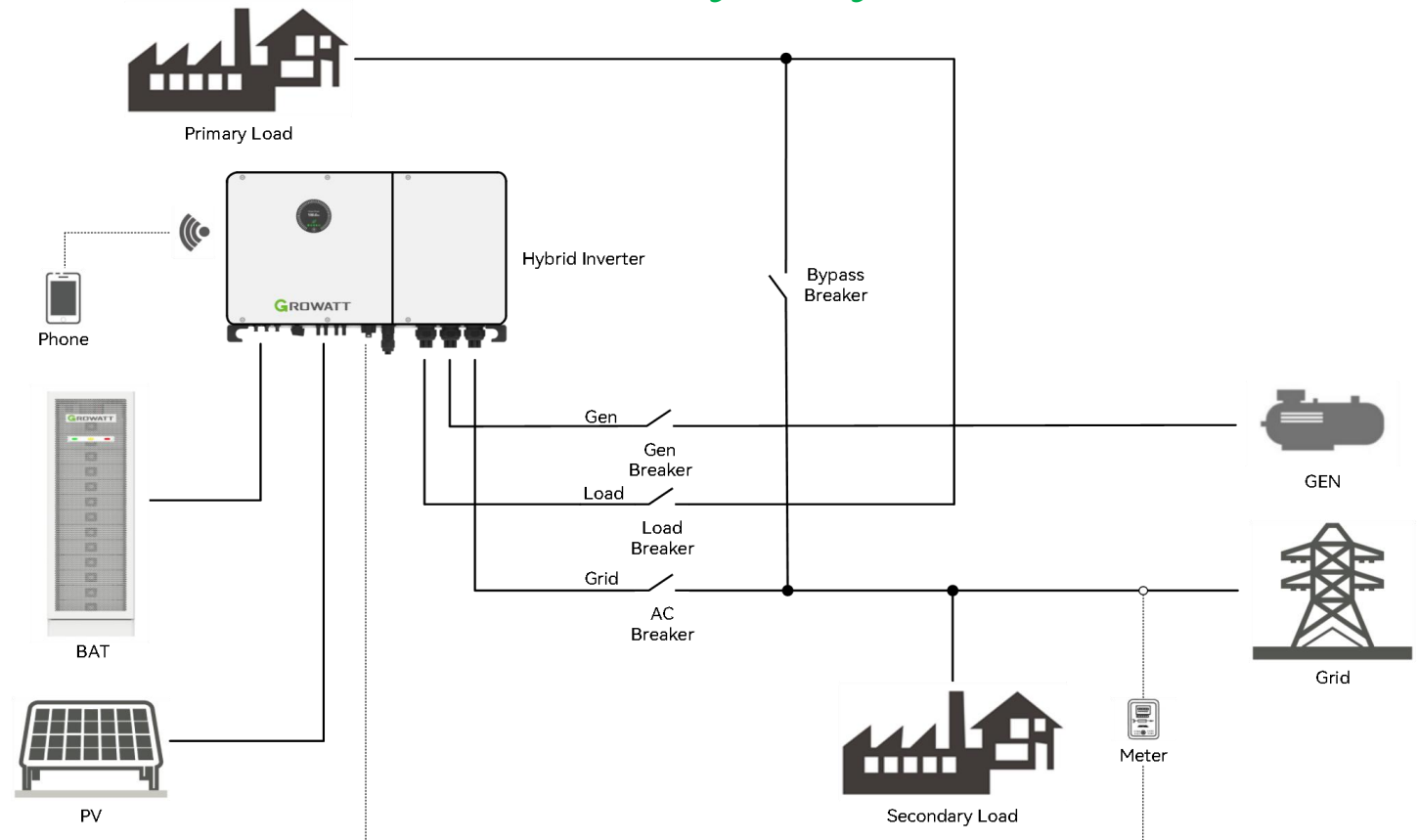
Application Scenario:

1. Poor grid, frequent power outage, with diesel generator
2. Available for solar installation
3. Need backup for crucial loads

Solution Benefit:

- Maximize solar energy self-consumption
- Ensure critical loads 24*7h operation
- Reduce electricity cost for users
- Reduce diesel generators cost

PV+BAT +GEN Hybrid System Solution

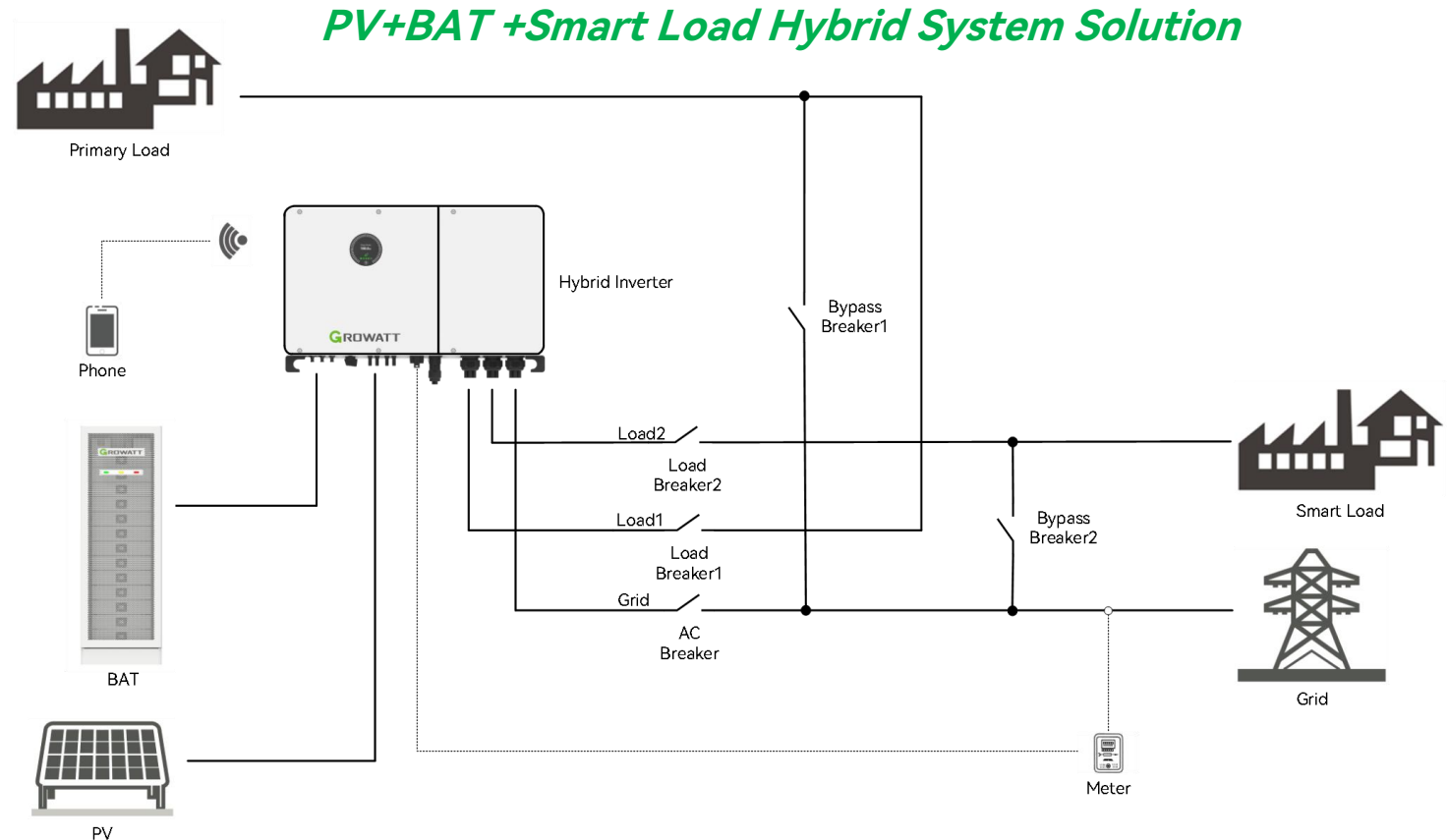


Application Scenario:

1. Relative stable grid, without diesel generator
2. Available for solar installation
3. Need backup for crucial loads
4. No redundant power distribution ports to connect smart loads

Solution Benefit:

- Maximize solar energy self-consumption
- Ensure continuous operation of critical loads
- Real-time monitoring smart load power
- Reduce electricity cost for users



Recommended Solution for C&I Application Scenarios

Application Scenario:

1. Relative stable grid, without diesel generator
2. Available for solar installation, the total solar power less than 150kWp for single system
3. All solar systems can operate in off-grid mode
4. Need backup for crucial loads

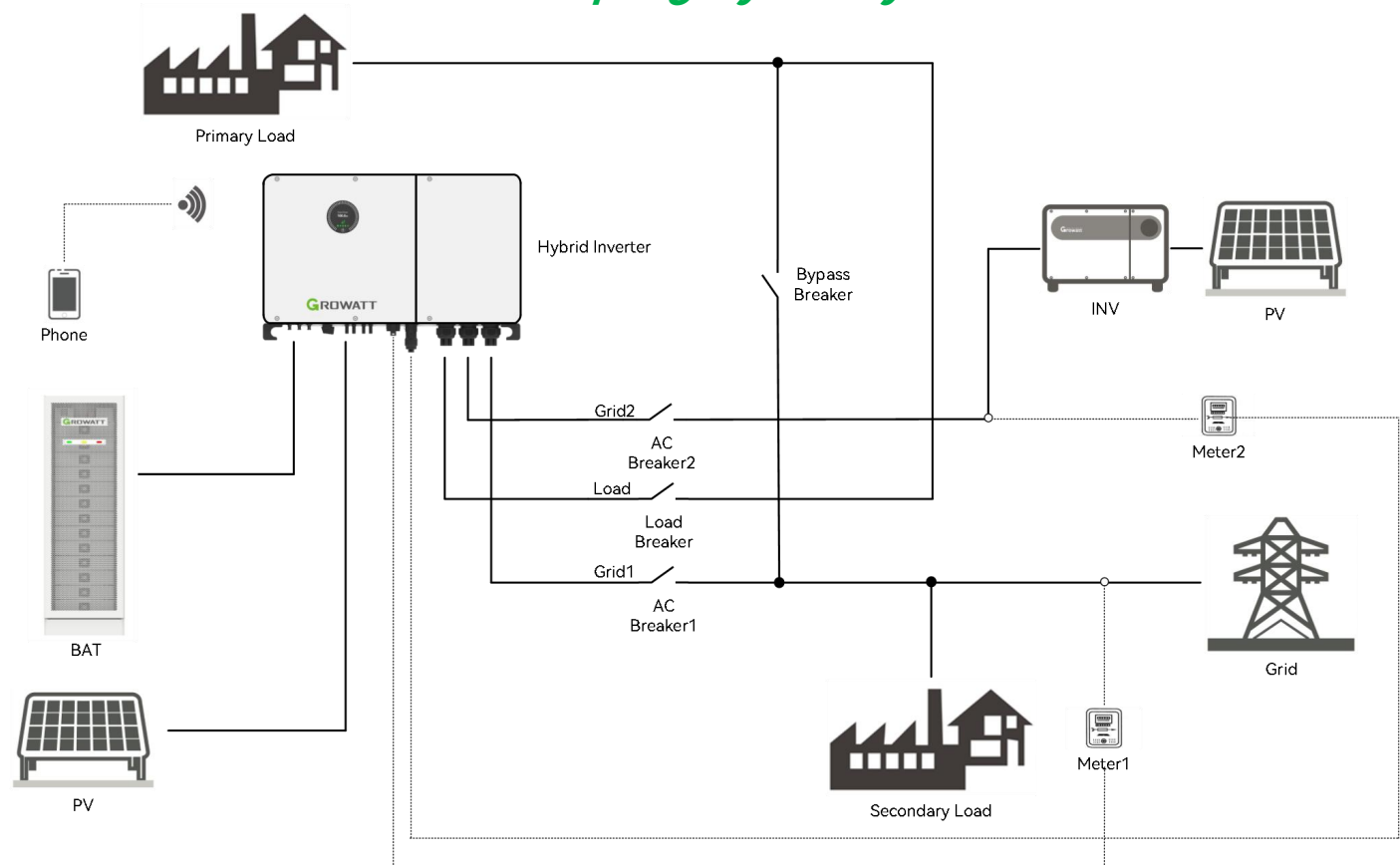
Solution Benefit:

- Maximize solar energy self-consumption
- Ensure continuous operation of critical loads
- Reduce electricity cost for users

Remark:

- Preferred Growatt PV inverter, MAX/MID.

AC coupling Hybrid System Solution



Recommended Solution for C&I Application Scenarios

Application Scenario:

1. Stable grid, installed solar system already
2. Newly built solar system and ESS, very large PV power, for away between solar system and ESS

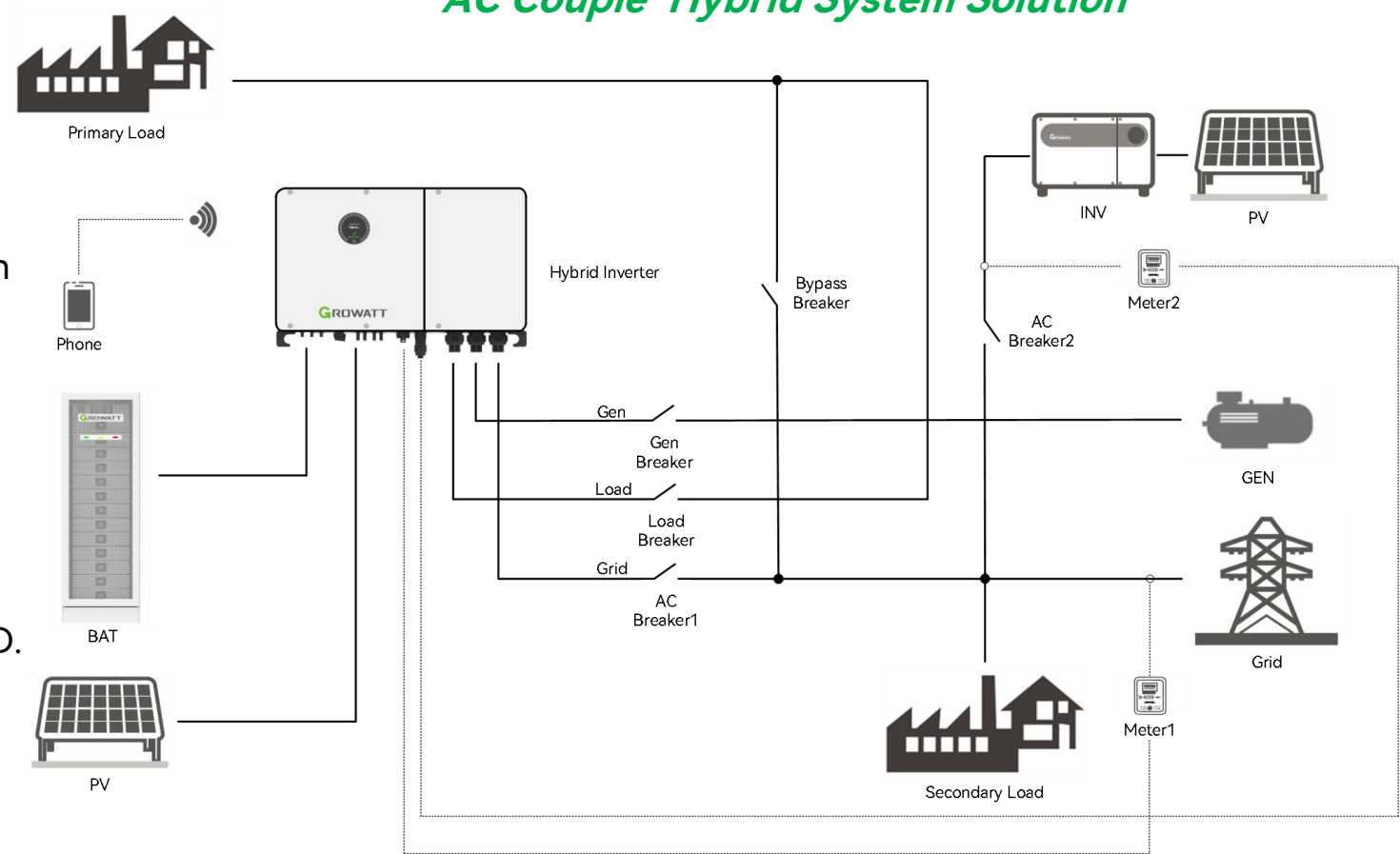
Solution Benefit:

- Maximize solar energy self-consumption
- Ensure critical loads 24*7h operation
- Reduce electricity cost for users
- Reduce diesel generators cost

Remark:

- Preferred Growatt PV inverter, MAX/MID.

AC Couple Hybrid System Solution



Recommended Solution for C&I Application Scenarios

Application Scenario:

1. Poor grid, frequent power outage, with diesel generator
2. Available for solar installation
3. Need backup for crucial loads

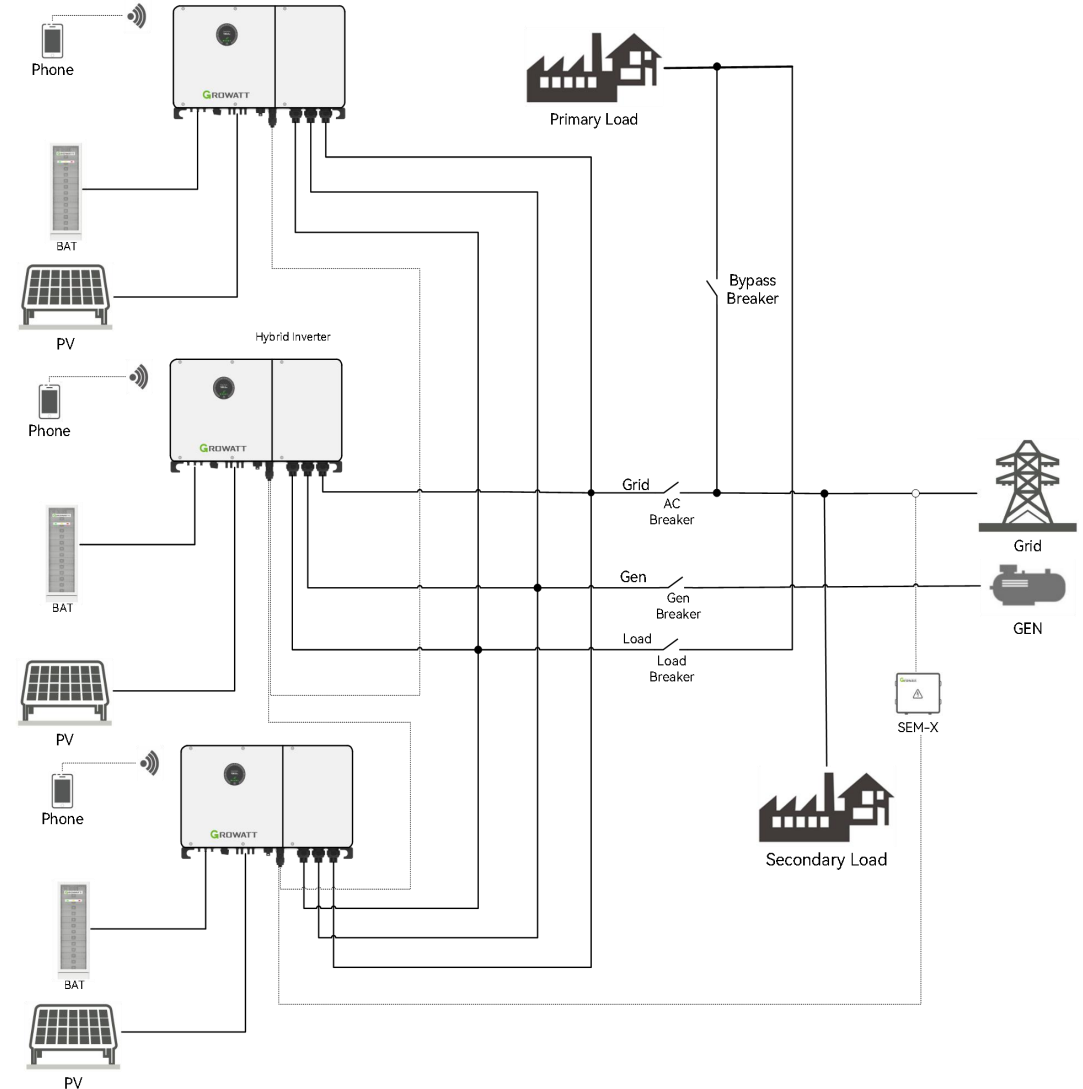
Solution Benefit:

- Maximize solar energy self-consumption
- Ensure critical loads 24*7h operation
- Reduce electricity cost for users
- Reduce diesel generators cost

Remark:

- Up to **3** inverters in parallel in off-grid mode
- Built-in meter in SEM-XA-RM

Multiple System Solution



04

WIT Hybrid Inverter Introduction



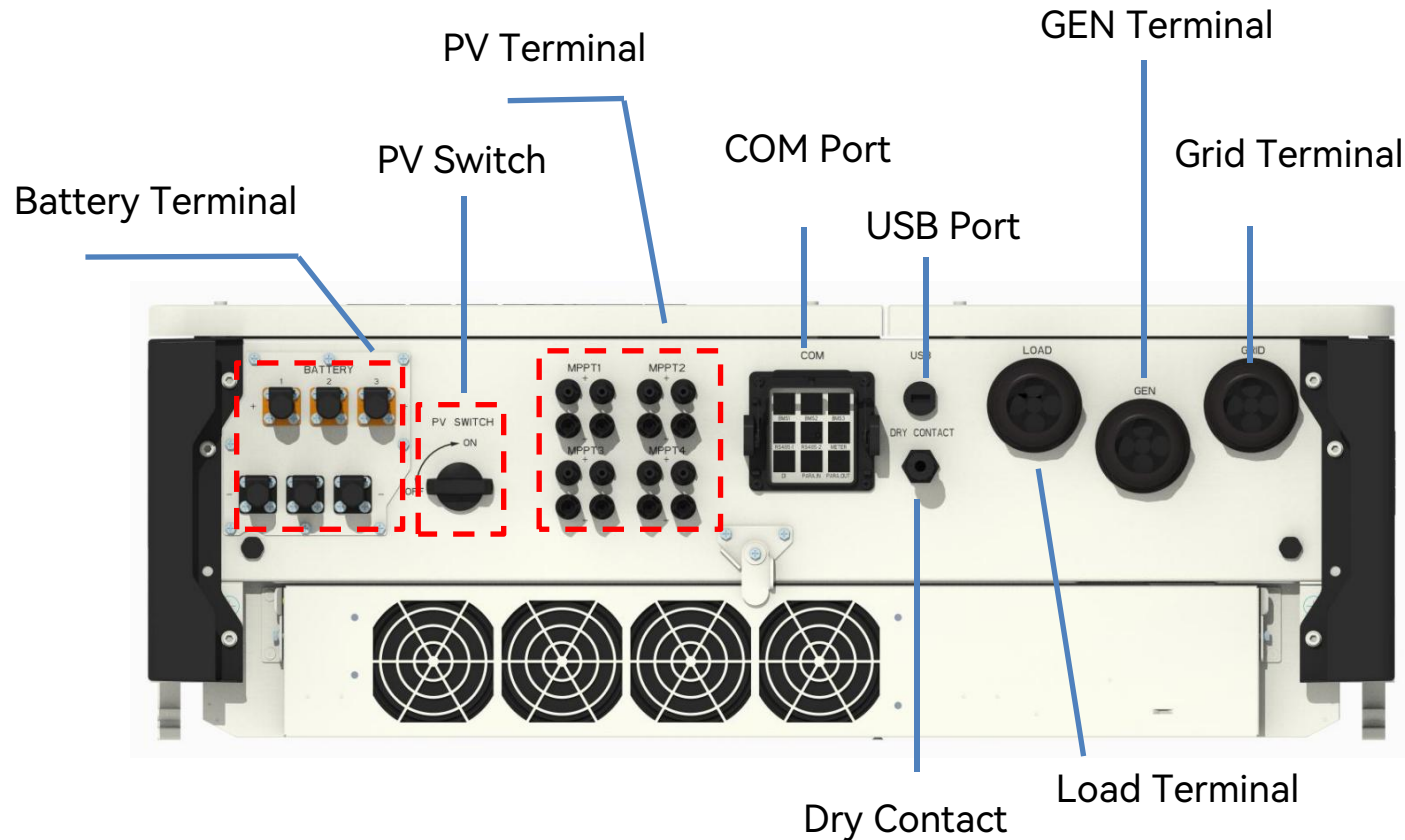
WIT 29.9-50K-XHU



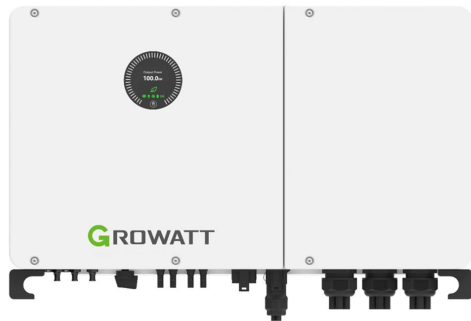
Hybrid Inverter

- **Nominal Output Power:** 29.9-50kW
- **Nominal AC Voltage:** 380V/400V
- **Nominal AC Frequency:** 50/60Hz
- **MPPT Input Number:** 4
- **Battery Input Number:** 3
- **MPPT Voltage Range:** 180-1000V
- **Battery Voltage Range:** 200-900V
- **AC Input Power:** 2 time nominal power
- **Max AC Outpt Power:** 110% rated power
- **Max Backup Power:** 150% rated power(10s)
- **AC Grid Connection Type:** 3P3W+PE or 3P4W+PE
- **Max. Efficiency:** 98.1%
- **Ingress Protection:** IP66
- **Wide Temperature Range:** -30°C ~ 60°C
- **Communicaiton Interface:** RS485/CAN/USB, WiFi/LAN (Opt)

Remark: For 29.9kW model, AC output and backup power is 29.9kW/kVA.



- 3 battery input
- 4 MPPT input
- 1 PV switch
- Load/GEN/Grid input port
- USB port : for datalogger
- Dry Contact: GEN start or close, emergency stop
- COM port: CAN/RS485/DRAM/DI



WIT 29.9-50K-XHU



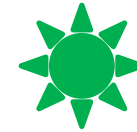
Higher Yields

- Up to 2.0 Ratio DC/AC
- Max. efficiency 98%
- String current 20A for high power modules
- 4 MPPTs, 3 battery input
- Build-in PID recovery function



Safe and Reliable

- Fuse free design
- IP66 protection degree
- Type II SPD on DC&AC side
- Active ARC protection (AFCI)



AC Power Ability

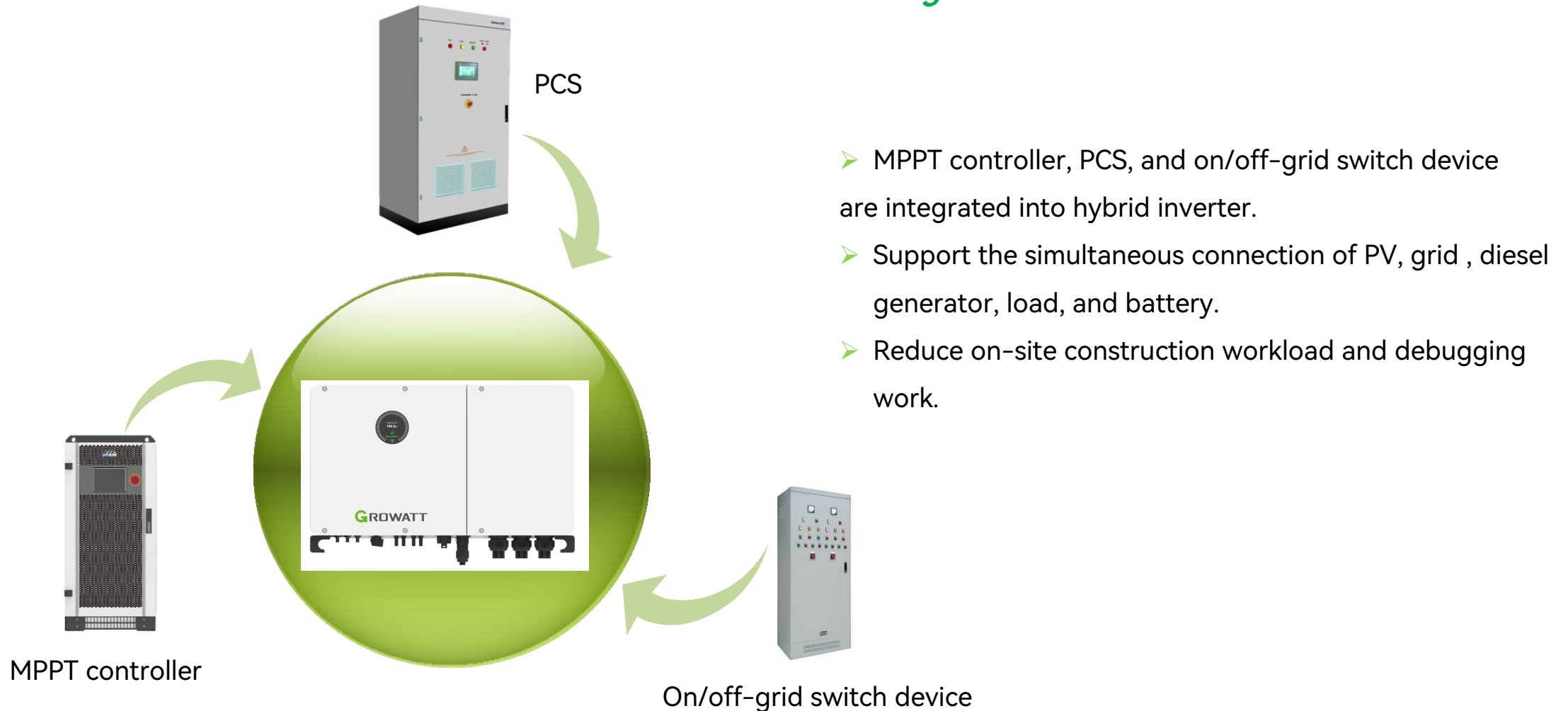
- 100% unbalanced load output
- 110% continuous AC overloading capacity
- 150% off-grid overload capacity
- Up to 3 parallel operation in off-grid application
- DG input and smart load function
- Less than 10ms switching time



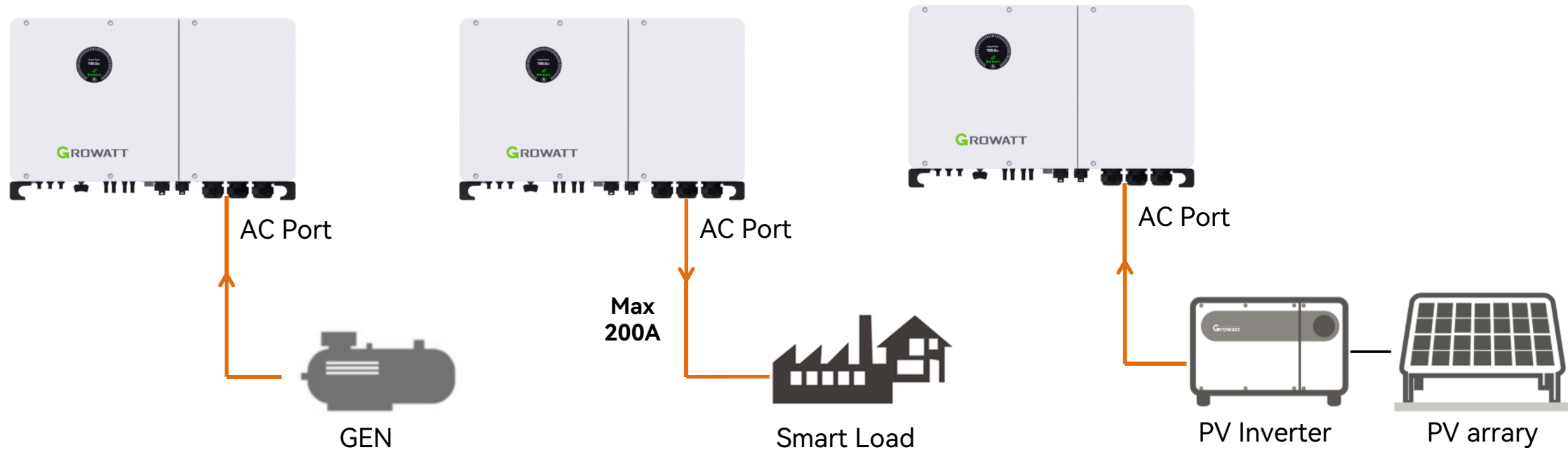
Smart

- Intelligent string monitoring
- Smart IV curve scanning
- One-click-diagnosis
- Remote online maintenance

All-in-One Design

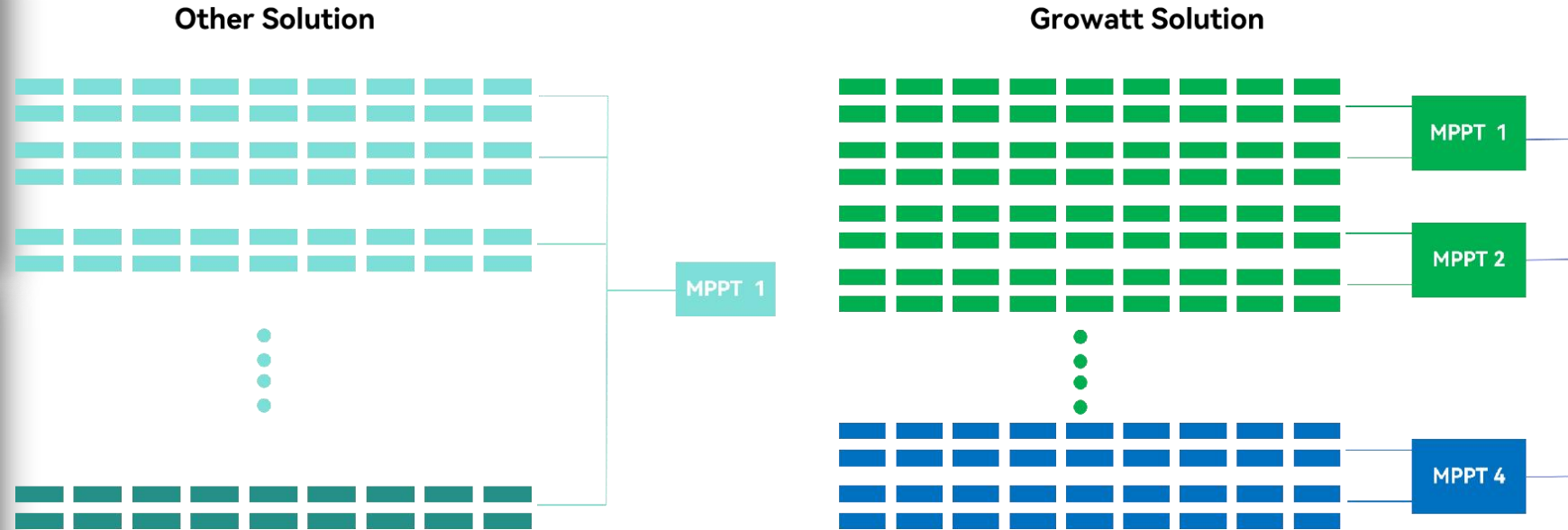
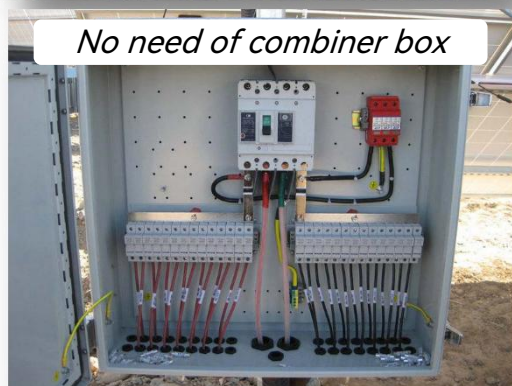


Multifunction AC Port, Meet Multiple Application Scenarios



- Supports diesel generator input, meet solar system+storage system+diesel generator application scenarios.
- Supports smart load output, max output current 200A.
- Supports PV inverter input, meet AC coupling solution.

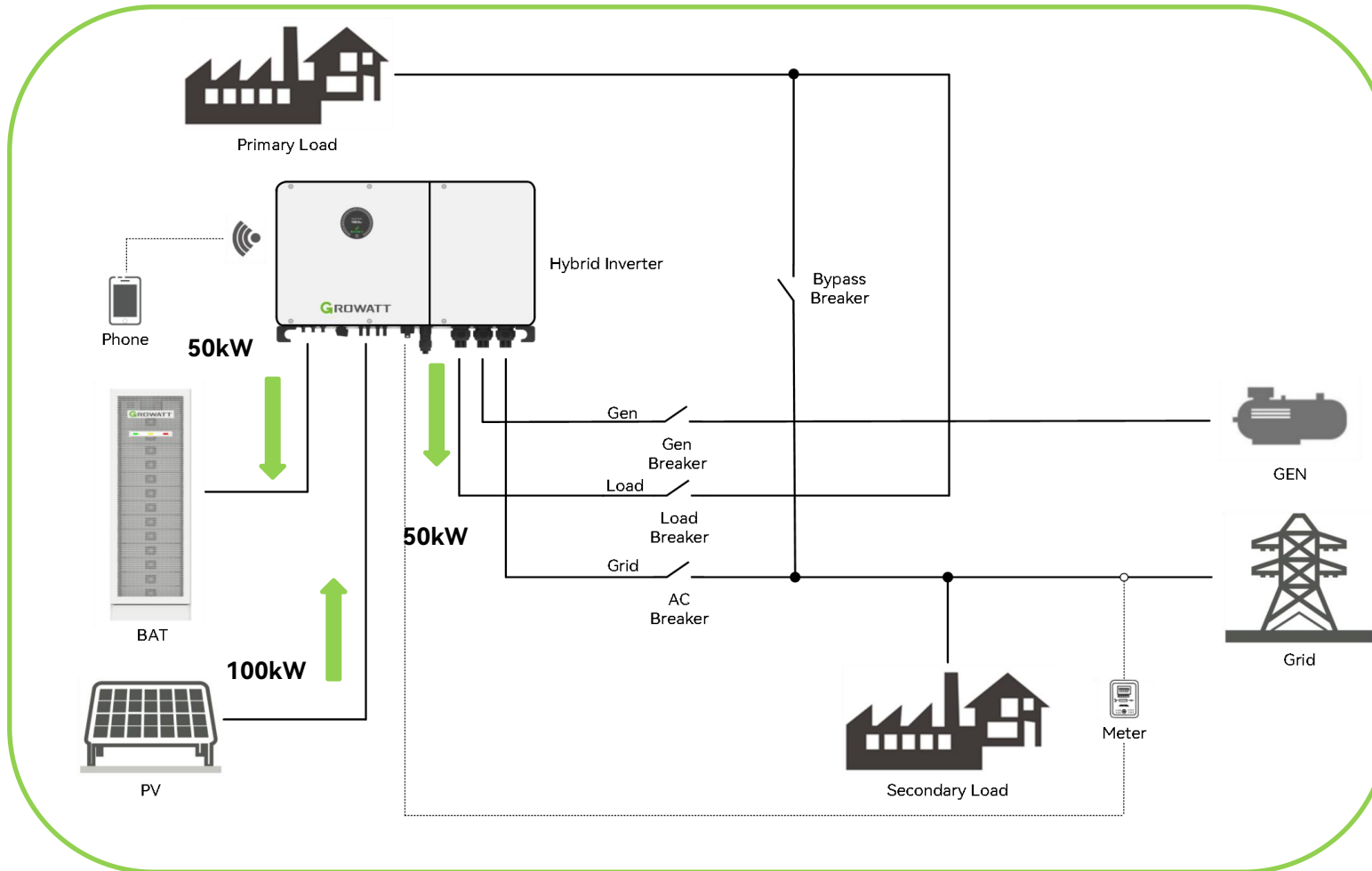
Multiple MPPTs, More Energy Yields



- No addition cost for PV combiner box
- Up to 4 MPP trackers, 2 strings per MPPT, 8 strings with intelligent string monitoring
- Versatile adaptations to different layouts, minimize string mismatch and energy loss, achieve more energy yields

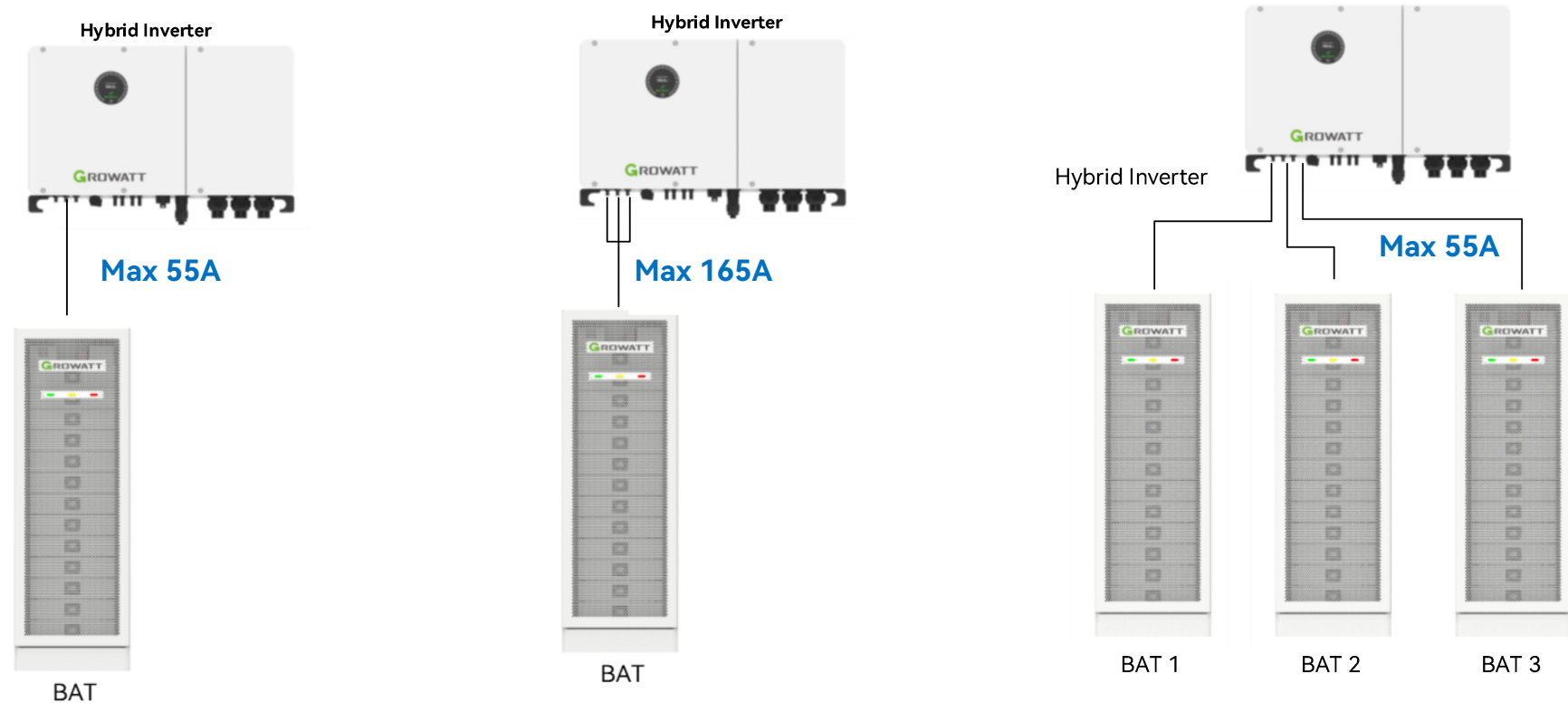
2x DC/AC Ratio Design

2X DC/AC Ratio, More Energy Yields



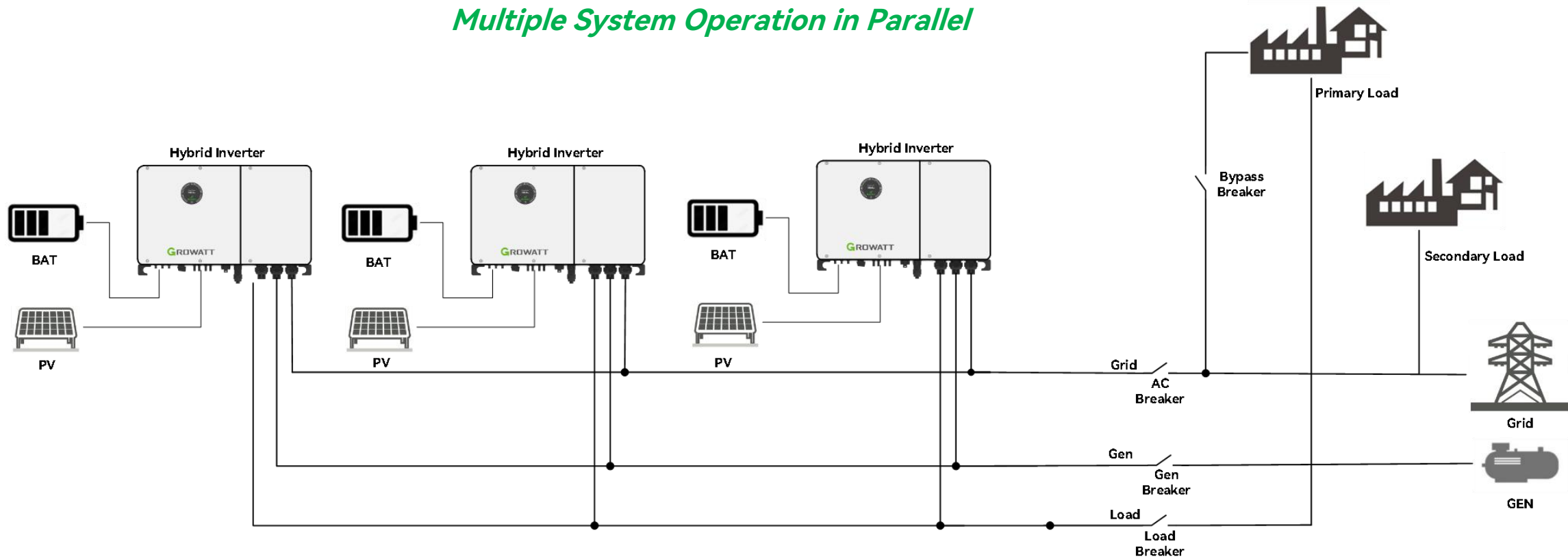
- The maximum input power of PV is twice that of AC rated power which achieve full power supply to the load, and the maximum power to charge the battery.

Multiple Battery Input, Easier Expansion



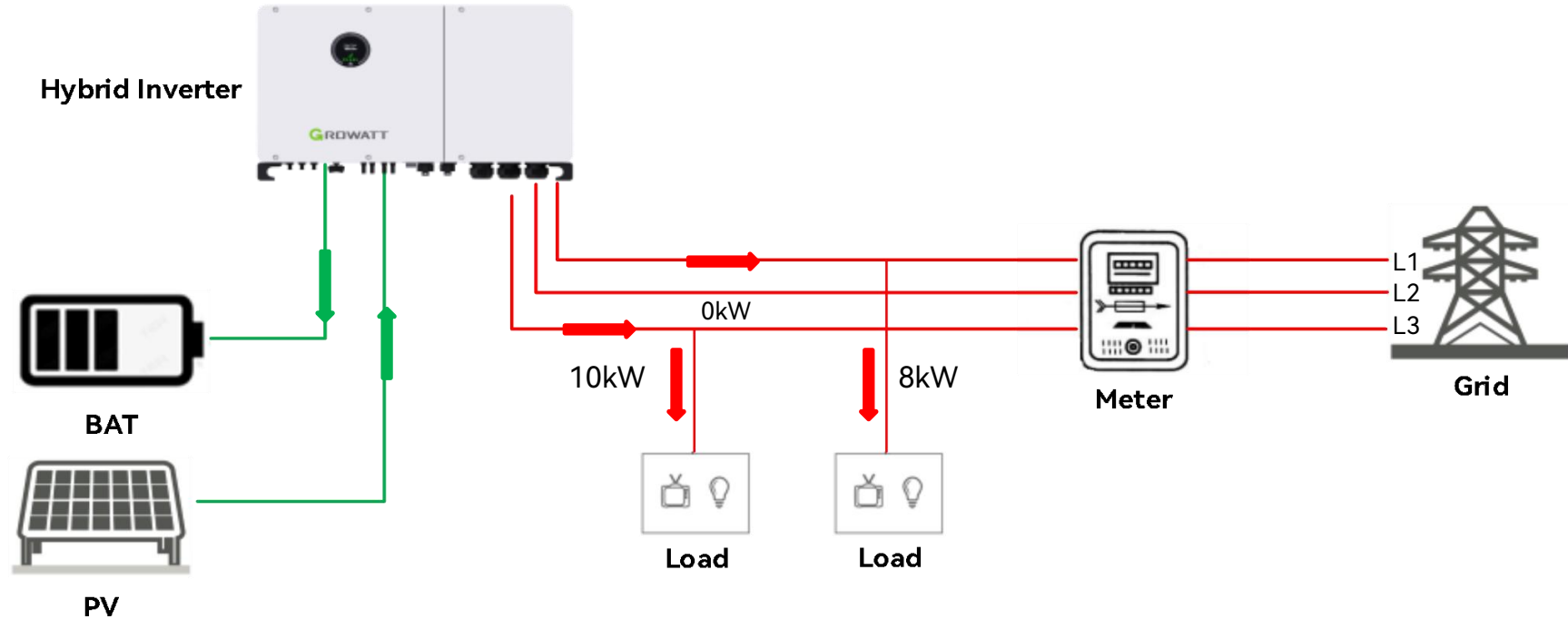
- Supports max **3 battery inputs** independently, each input charge/discharge current reach **55A**
- 3 battery inputs can be combined into one input to increase the charge and discharge current, max current **165A**.
- Supports 3 battery input with **different battery capacities, DC voltages, and manufacturers**;
- Supports each battery installation in different stage, saving customers' initial cost.

Multiple System Operation in Parallel



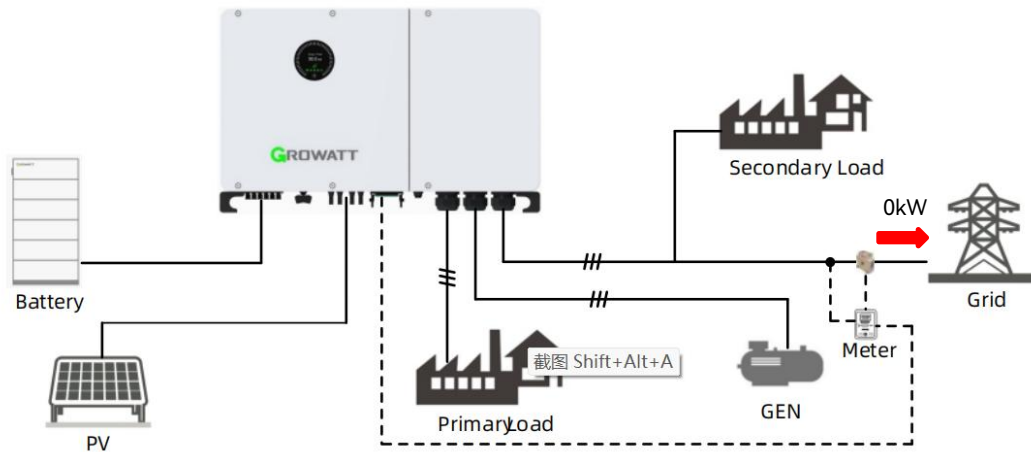
- Supports max **3 hybrid inverter** (150kW) in parallel in off-grid mode
- Supports automatic switching between on-grid mode and off-grid mode

Three Phase 100% Unbalanced Output Function



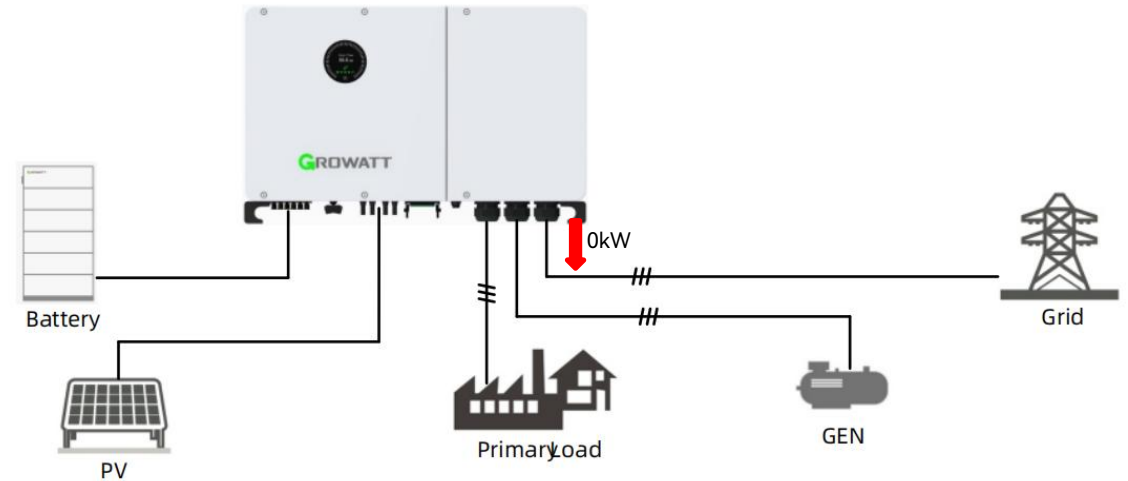
Remark: Customer needs to enable export limit function, Max. power output of single phase is 16.7kW for 50kW.

Zero Export to Meter



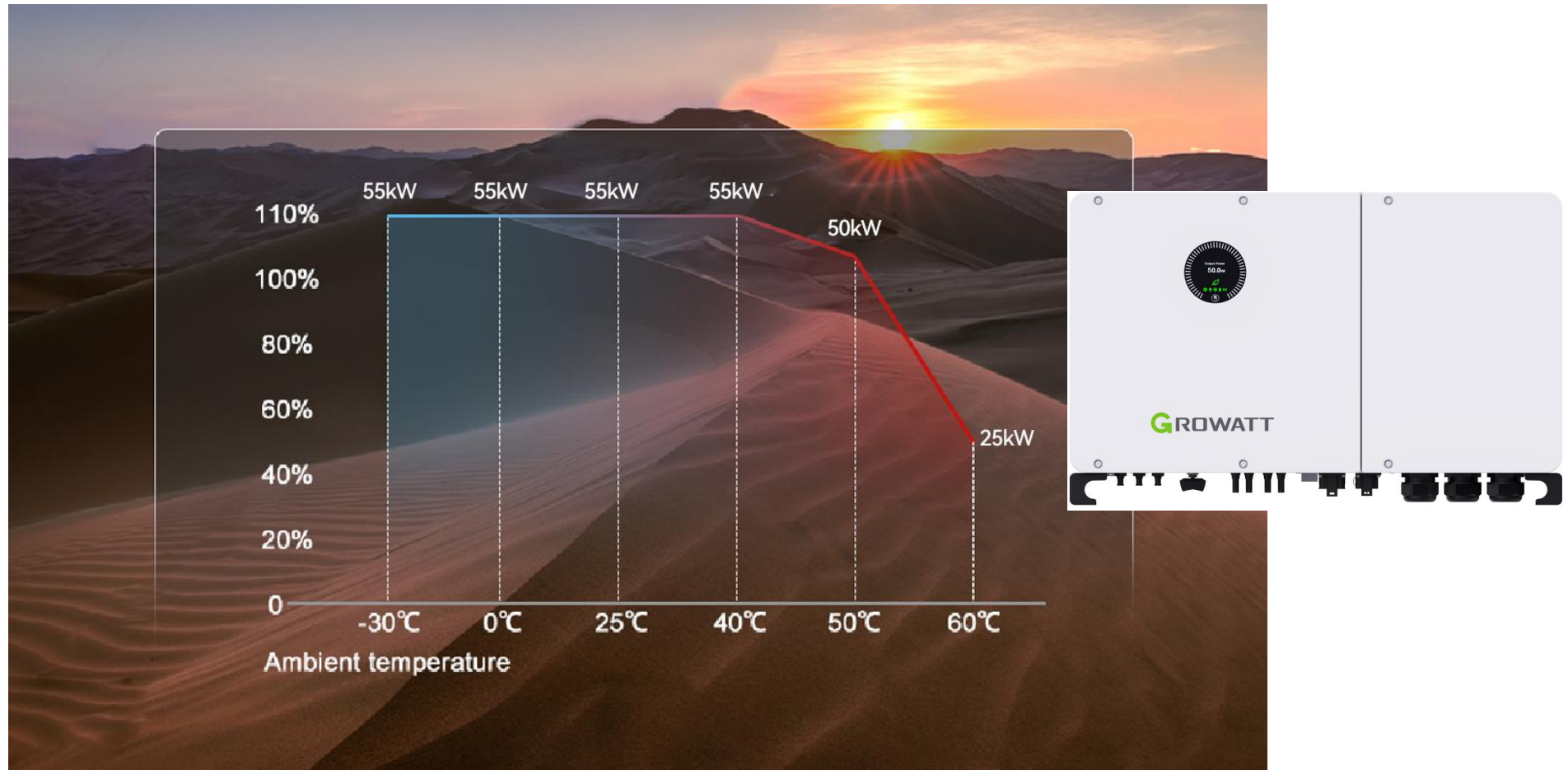
In this mode, no solar power or battery energy will be fed to the grid. The inverter output is only supplied to the loads connected before the external meter connection point. A meter is required.

Zero Export to Grid Port

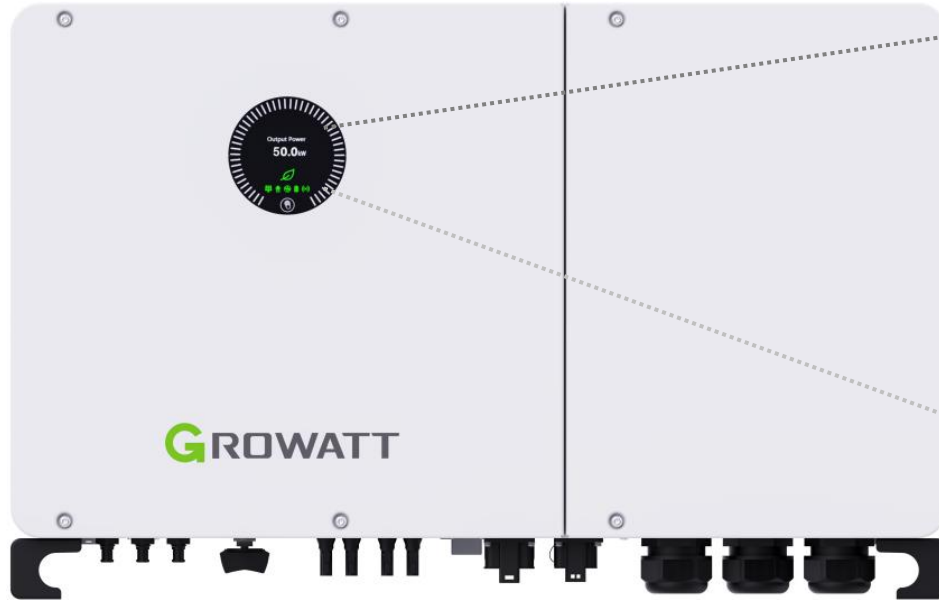


In this mode, there is no output at the inverter's GRID port. The solar and battery power can only be supplied to Primary Loads via the LOAD port. The meter is not required.

Wide Operating Temperature



Ultimate User Experience



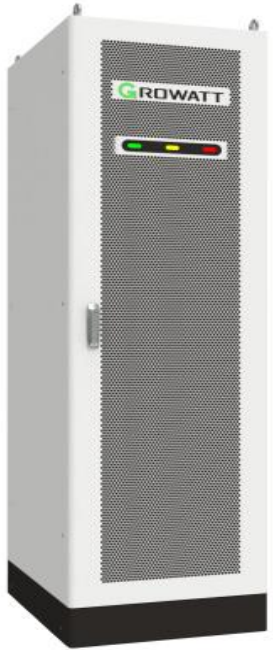
OLED Screen plus Touch Key

Get everything at a glance like battery soc, the state of PV/grid/battery, working modes, communication state, output power, alarm, fault etc.

05

AXE Commercial Battery System





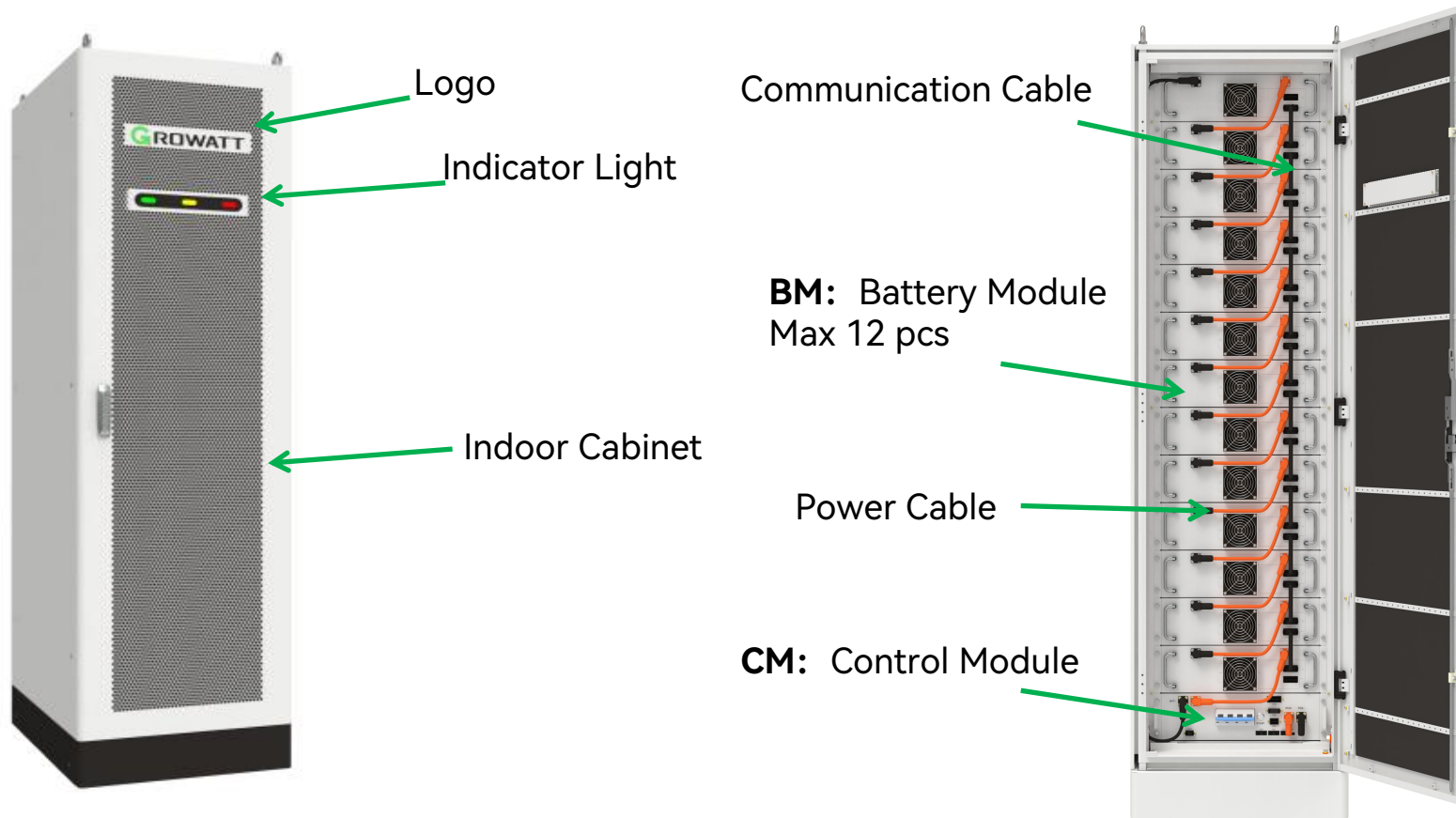
AXE 30-60H-CE1



AXE 30-60H-RE1

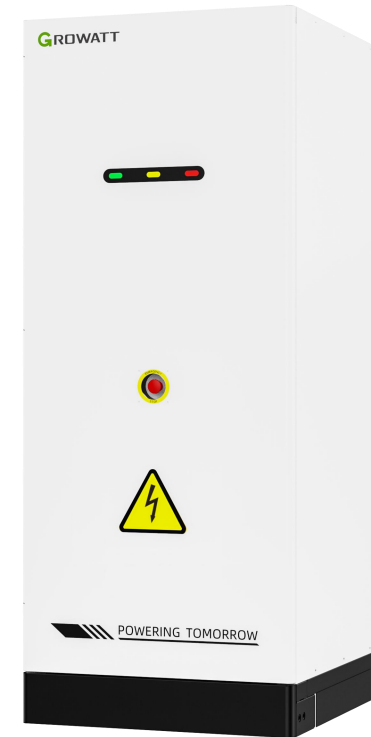
AXE 30-60H-C(R)E1

- **Nominal Energy:** 30/35/40/50/60kWh(6~12 battery module)
- **Battery Module Energy:** 5.12kWh (51.2V100Ah)
- **Battery Type:** LFP
- **DOD:** 90%
- **Max Charge/discharge Current:** 1C(continuous)
- **Ingress Protection:** IP20
- **Cooling Mode:** Natural air cooling
- **Wide Temperature Range:** -10°C ~ 50°C
- **Communicaiton Interface:** RS485/CAN
- **Size:** W600*D800*H2200mm
- **Installation Method:** Indoor Cabinet or Indoor Rack

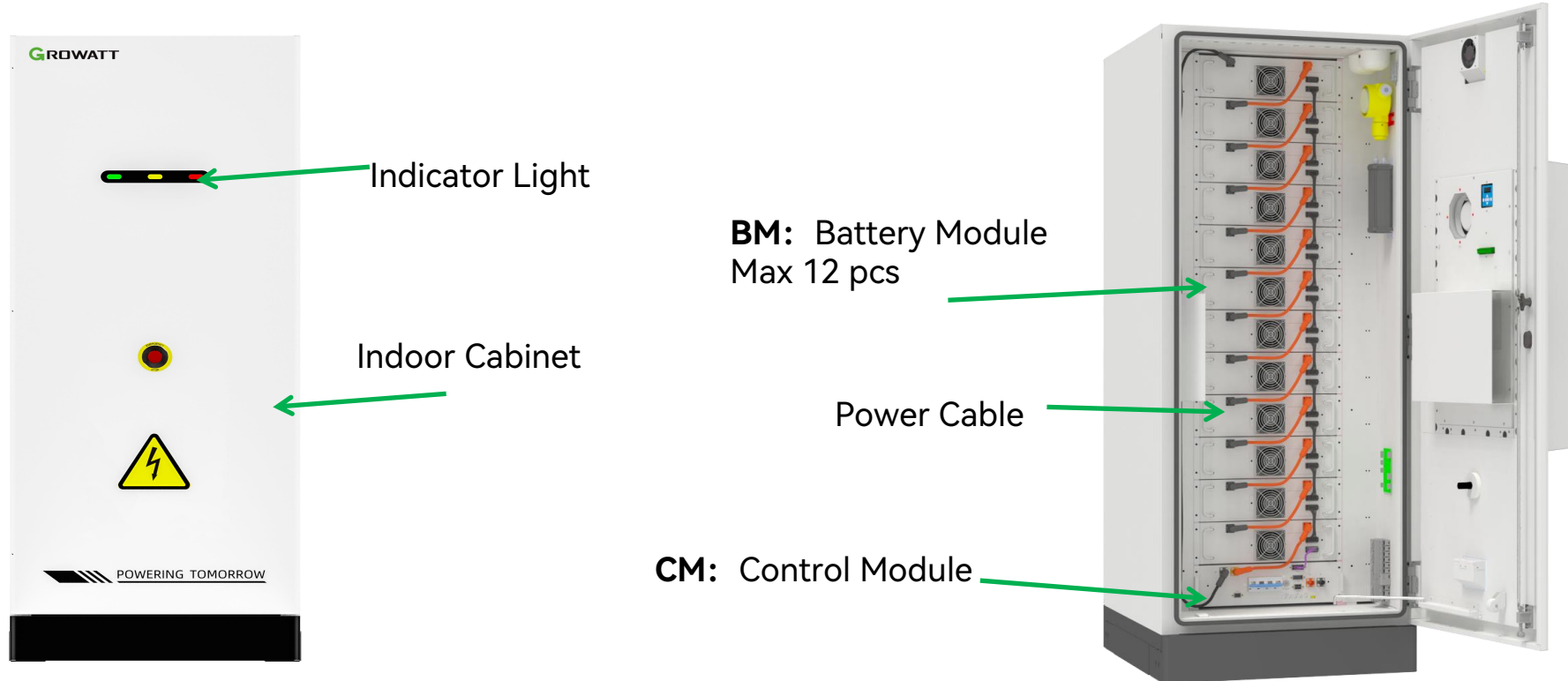


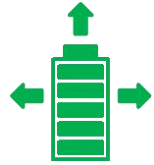
AXE 60H-TE1

- **Nominal Energy:** 60kWh
- **Battery Module Energy:** 5.12kWh (51.2V100Ah)
- **Battery Type:** LFP
- **DOD:** 90%
- **Max Charge/discharge Current:** 1C(continuous)
- **Ingress Protection:** IP55
- **Cooling Mode:** air conditioner
- **Wide Temperature Range:** -25°C ~ 55°C
- **Communicaiton Interface:** RS485/CAN
- **Size:** W800*D800*H2200mm
- **Installation Method:** Outdoor Cabinet



AXE 60H-TE1





Flexible Expansion Design

- 5kWh scalable battery pack
- 30kWh-60kWh scalable energy capacity for single battery cabinet



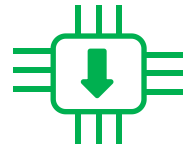
Flexible and Convenience

- Support distributed or centralized deployment
- Easy installation and maintenance
- Two people to complete single BM installation



Safe and Reliable

- Prismatic LFP Cell
- Multiple Level Protection
- Built-in aerosol (Opt) in battery pack



Smart

- Support USB upgrade
- Integrated BMS to monitor system status in real time

06

Smart O&M

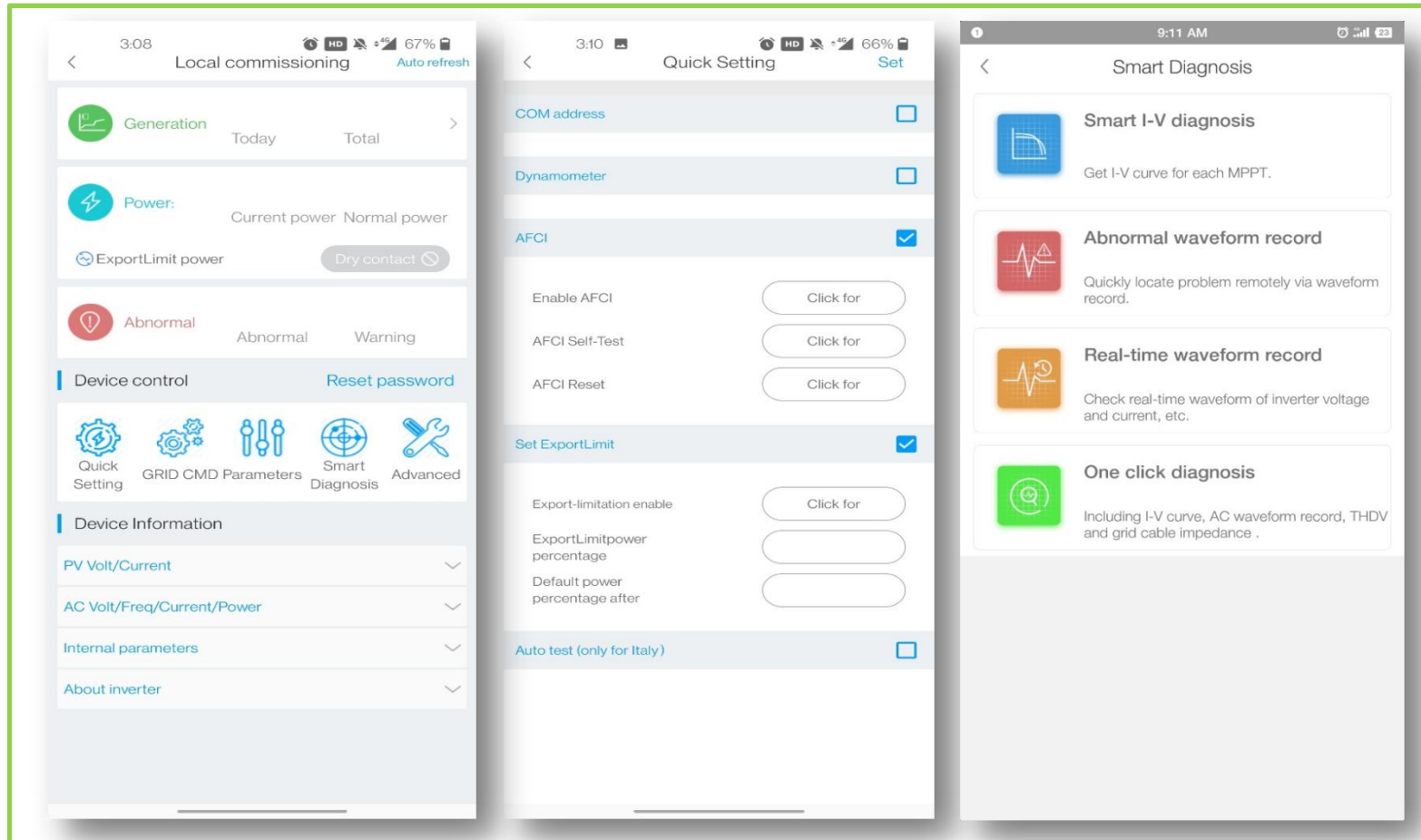


- One-click-diagnosis for solar input side, no need professional people or equipment
- Intelligent I-V curve detection, realizing intelligent operation and maintenance
- Accurate fault location and trouble-shooting guide



USB-WiFi+ShinePhone

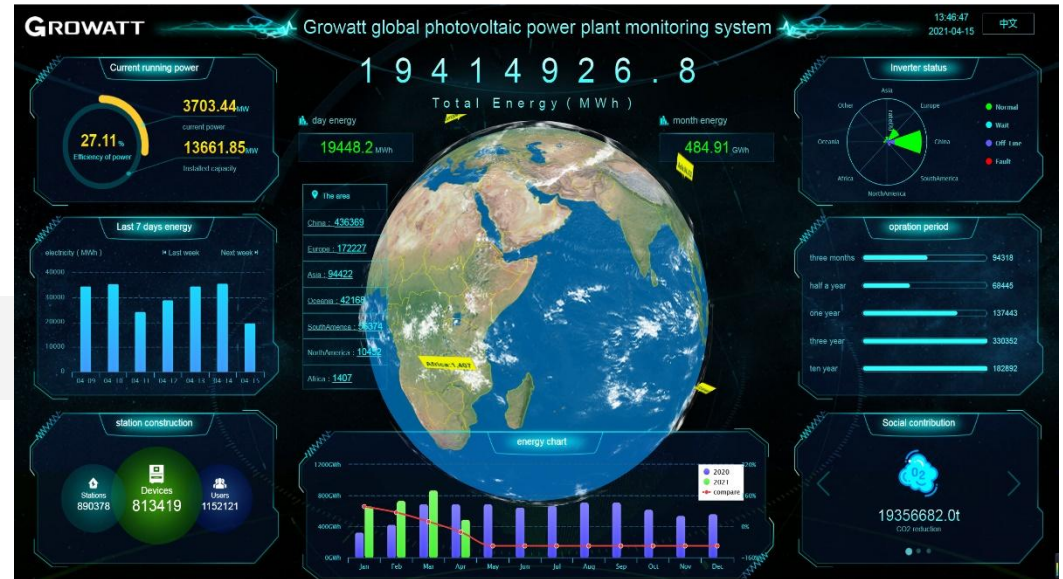
- Make it more easier for local commissioning
- For examples, turn on/off AFCI, turn on/off export limitation, I/V curve scanning



Fast and easy, saving cost and time, peace in mind



Configuration via APP
USB-WiFi+ShinePhone App



Online Smart Service
Remote Firmware upgrade
Remote diagnose and configuration

Whole System Warranty



Complete Equipment Supply

Inverter, Lithium Battery, ATS and Monitoring

Whole System Guarantee

Guidance and help of the whole system,

Warranty for all devices,

Professional and local service team

Thanks!

www.ginverter.com



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