

SMART ENERGY STORAGE SOLUTION



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We, the Smart Energy Innovator

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✓ Enhance self-consumption

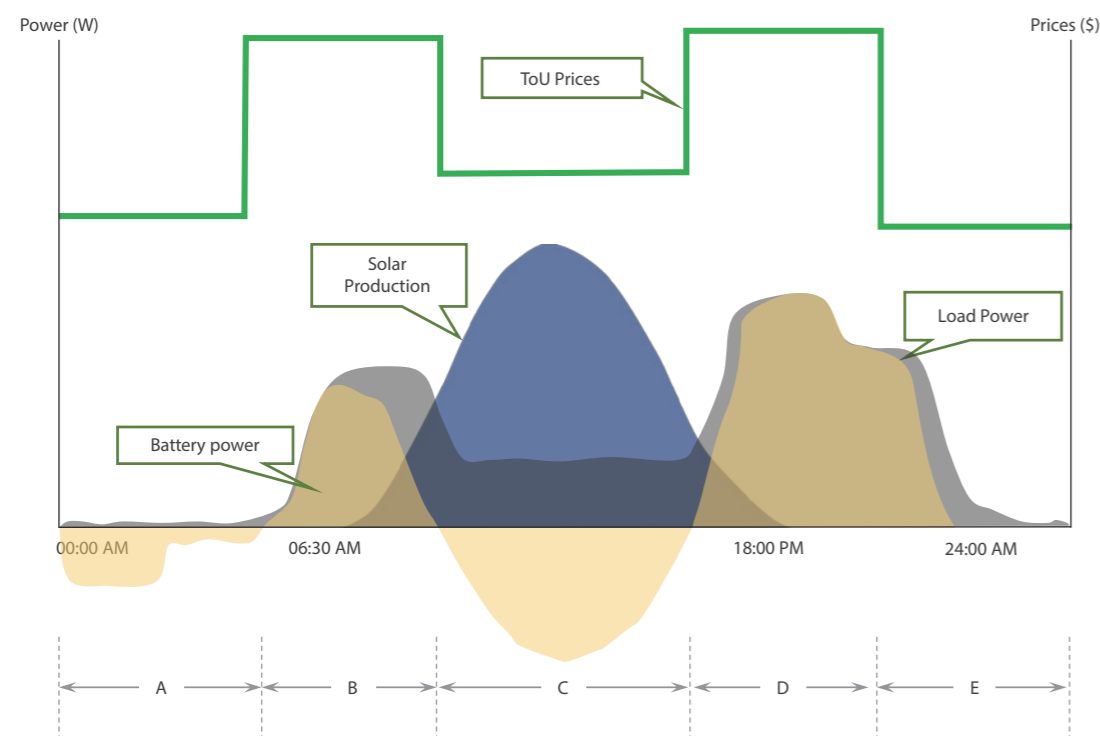
✓ Provide backup for critical loads

✓ Time of Use

Three Main Application Scenarios

- Enhance self-consumption: the battery system stores excess power generated from the PV array to inject solar power to the grid and avoid restricting solar production. When solar production is weak, the battery will discharge to support load consumption.
- Provide backup for critical loads: The battery stores solar power or takes energy from the grid for energy requirements during grid outage. Loads such as refrigerators, routers, lamps, computers and other critical appliances can be powered when the grid fails. The system can automatically switch to backup mode within 8 milliseconds.
- Time of Use (ToU): By setting the charging and discharging time, the battery can be charged using electricity generated at off-peak rates and discharged to power loads during peak hours.

Simulation of Daily Operation

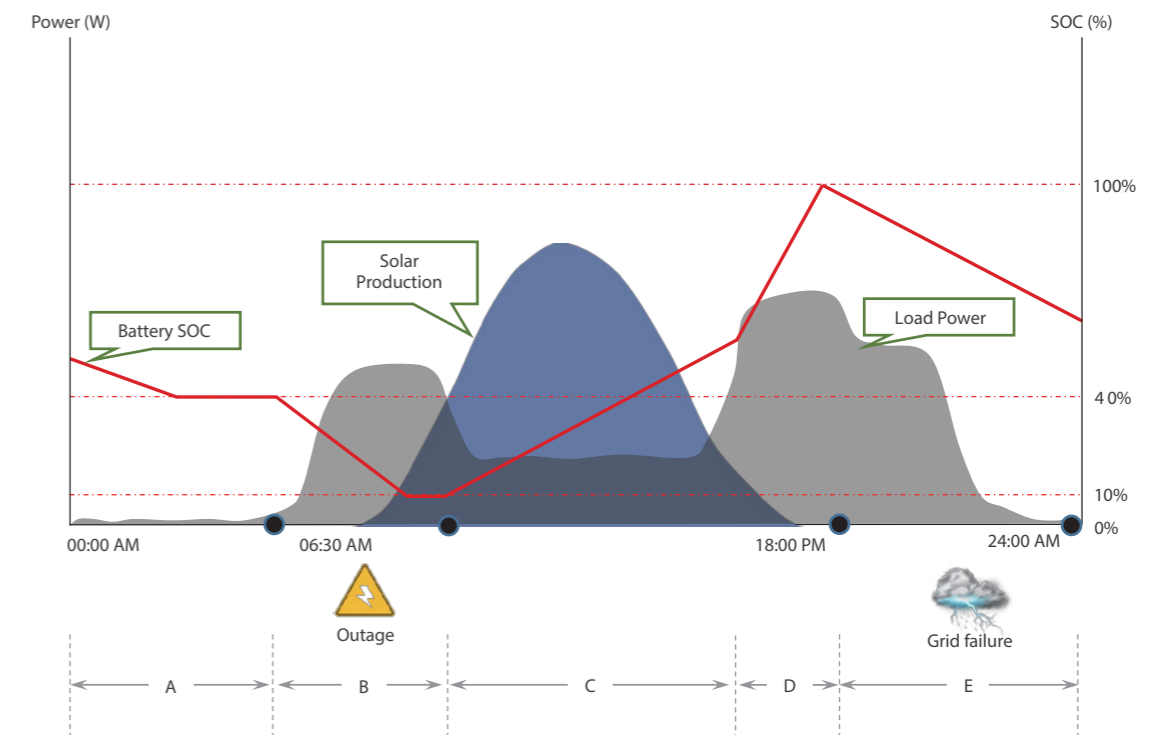


The figure above provides a more intuitive understanding of various application scenarios:

- Time interval A: By setting the charging and discharging time, the battery can be charged from the grid at off-peak rates with a favorable ToU pricing (Time of Use).
- Time interval B: The battery will discharge to power the loads during peak hours before the PV system takes over early in the morning (Self-Use).

- Time interval C: During the day, the electricity from the PV array is used to optimize self-consumption. Any excess power charges the battery (Self-Use).
- Time interval D: The load will be supplied by solar power and the battery will discharge during peak hours to avoid high ToU Price (Time of Use).
- Time interval E: When battery power is insufficient, loads will be supplied by the grid with a favorable ToU pricing (Time of Use).

In regions where power failure occurs frequently, the stability and safety of household consumption will be guaranteed by the energy storage system. Battery protection can also be achieved with an adjustable Depth of Discharge (DOD).

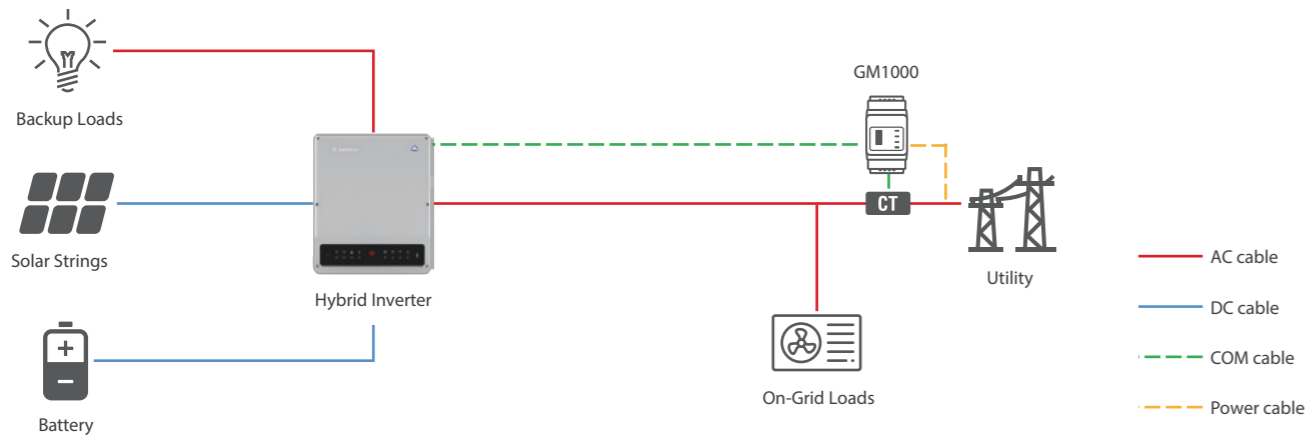


- Time interval A: In grid-tied state, the battery will stop powering the loads according to the on-grid DOD (60%). The remaining load consumption will be powered by the grid.
- Time interval B: Critical loads connected to the backup side of the inverter, such as routers, lamps, computers and other essential appliances can be powered by the battery during an outage until its SOC reaches the off-grid DOD (90%).
- Time interval C: During the day, the electricity from the PV array is used to optimize self-consumption. Any excess power charges the battery.
- Time interval D: In the event of grid failure caused by extreme weather, the battery will be fully charged in advance through the forced charging function.
- Time interval E: The battery will discharge to power the critical loads during the grid failure.

2.1 Hybrid Solutions

Hybrid inverters are the core of energy storage systems and they integrate the following elements into one unit: MPP trackers, power inverter, battery charging & discharging function, BMS communication and by-pass & backup function. GoodWe’s hybrid portfolio is a perfect fit for a wide range of residential and small commercial scenarios. It is suitable for both single-phase and three-phase systems.

System Wiring



Operation Modes & Applicable Models

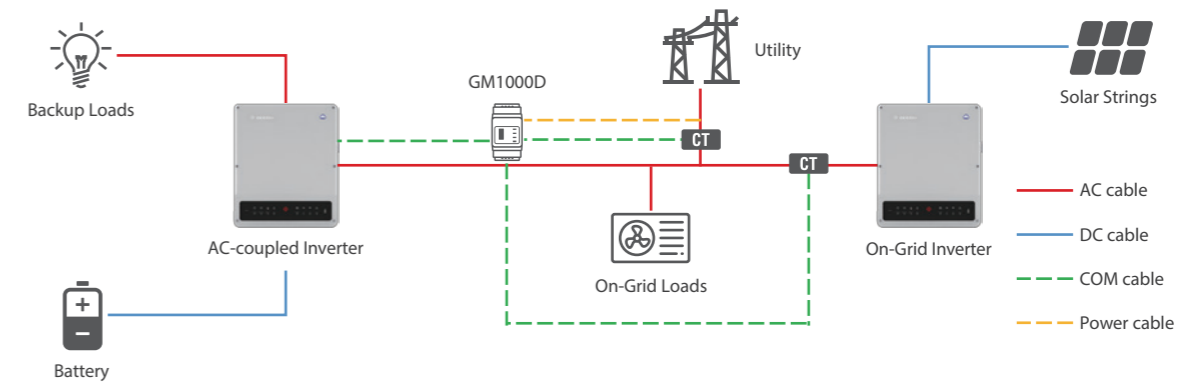
Solar power will support loads first then charge the battery. Any excess power will be exported to the grid and can be limited with GM1000/GM3000. The following hybrid inverters are perfectly adapted to all application scenarios mentioned above.

	ES	ESA	EM	EH	ET
Power Range	3.6-5kW	5kW + 9.6kWh	3-5kW	3.6-6kW	5-10kW
Grid Type	Single-Phase	Single-Phase	Single-Phase	Single-Phase	Three-Phase
Lithium Battery	SECU-A, Lynx Home U Series (LV)	SECU-A (LV)	SECU-A, Lynx Home U Series (LV)	Lynx Home F Series (HV) Coming soon	Lynx Home F Series (HV) Coming soon
Accessory (Standard)	GM1000	GM1000	GM1000	GM1000	GM3000

2.2 AC-coupled Retrofit Solutions

GoodWe AC-coupled retrofit inverters integrate the following key elements into one single unit: power inverter, battery charging & discharging function, BMS communication and the by-pass & backup function. This type of inverter is designed to make it easy to convert and upgrade existing grid-tied systems into hybrid ones. It is suitable for both single-phase and three-phase systems and is compatible with various power sources, including solar and wind generators of different brands in both residential and commercial scenarios.

System Wiring



Operation Modes & Applicable Models

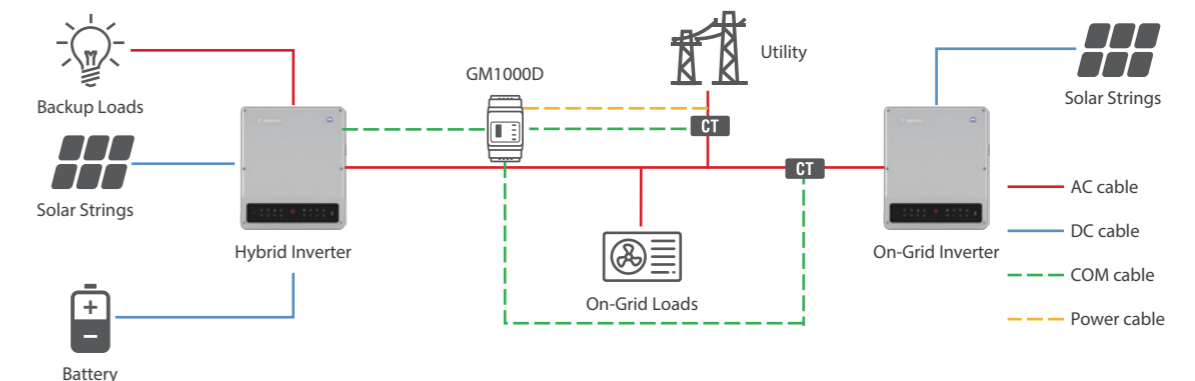
Similar to the hybrid system, the default setting in AC-coupled retrofit inverters prioritizes PV generation to power the loads, then charges the battery and finally exports any surplus power to the grid, which can be limited with GM1000D/GM3000. One major difference compared to a newly installed hybrid system is that the PV will not work during the daytime if there is an outage. This is because the original grid-tied inverter is not designed to work when the grid fails, so only the battery can power essential loads for the duration of the outage.

	SBP	BH	BT
Power Range	3.6-5kW	3-6kW	5-10kW
Grid Type	Single-Phase	Single-Phase	Three-Phase
Lithium Battery	SECU-A, Lynx Home U Series (LV)	Lynx Home F Series (HV) Coming soon	Lynx Home F Series (HV) Coming soon
Accessory (Standard)	GM1000D	GM1000D	GM3000

2.3 AC-coupled + DC-coupled Solutions

GoodWe provides a solar capacity extension solution, which integrates both hybrid and retrofit functions into a single system, allowing adaption to higher power consumption patterns in both single and three phase systems. In both on-grid systems as well as hybrid, solar energy is used to supply electricity to both back-up loads and charge the battery before the power is injected into the grid.

System Wiring



Operation Modes & Applicable Models

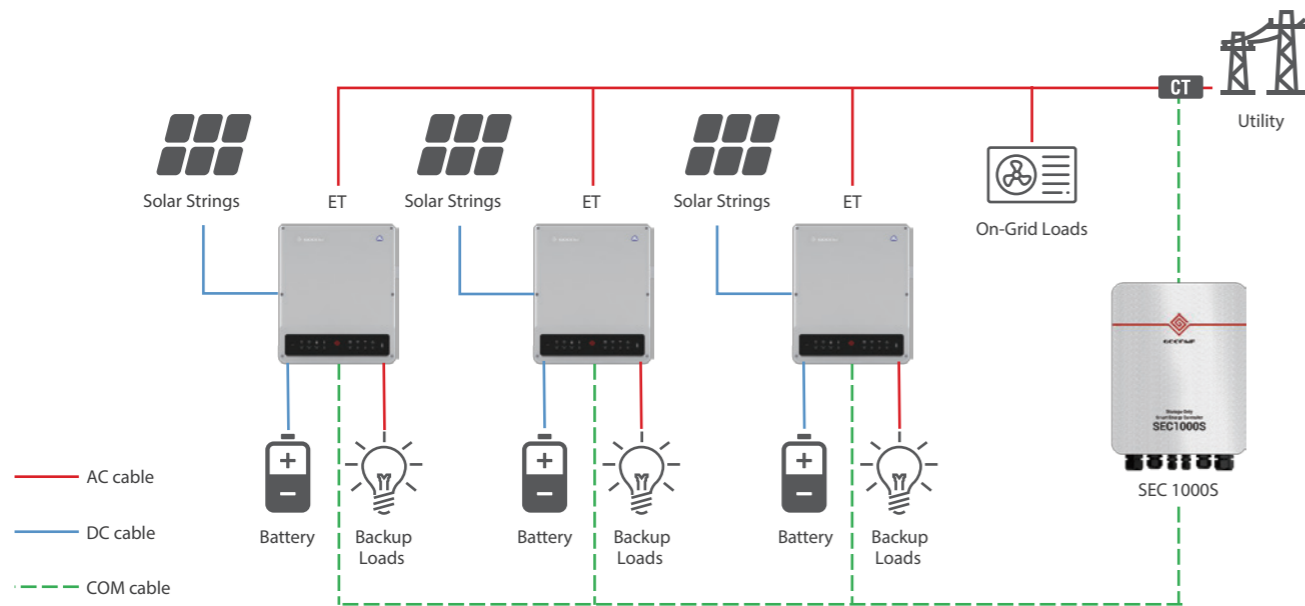
This system works in a similar way to hybrid system: solar energy first supplies the loads, then charges the battery and finally feeds the grid. If the grid fails, the on-grid inverter will not work and on-grid loads will not be available during the outage. Backup loads can still be powered by discharging the battery with PV generation. This kind of solution is suitable for GOODWE ES, EM, EH and ET series. It can also work with any brand of solar inverter.

2.4 Paralleling Solution

The three-phase inverter paralleling solution is especially designed to meet the increasing demand for PV storage systems with higher capacity and is perfectly suited to commercial storage systems. This kind of solution involves the integration of multiple hybrid inverters on the AC side (maximum 10 units) into one single system.

System Wiring

The use of SEC1000S (GoodWe's Smart Energy Controller) is recommended to achieve a smooth interconnection of all the units in a paralleling scenario.



Operation Modes & Applicable Models

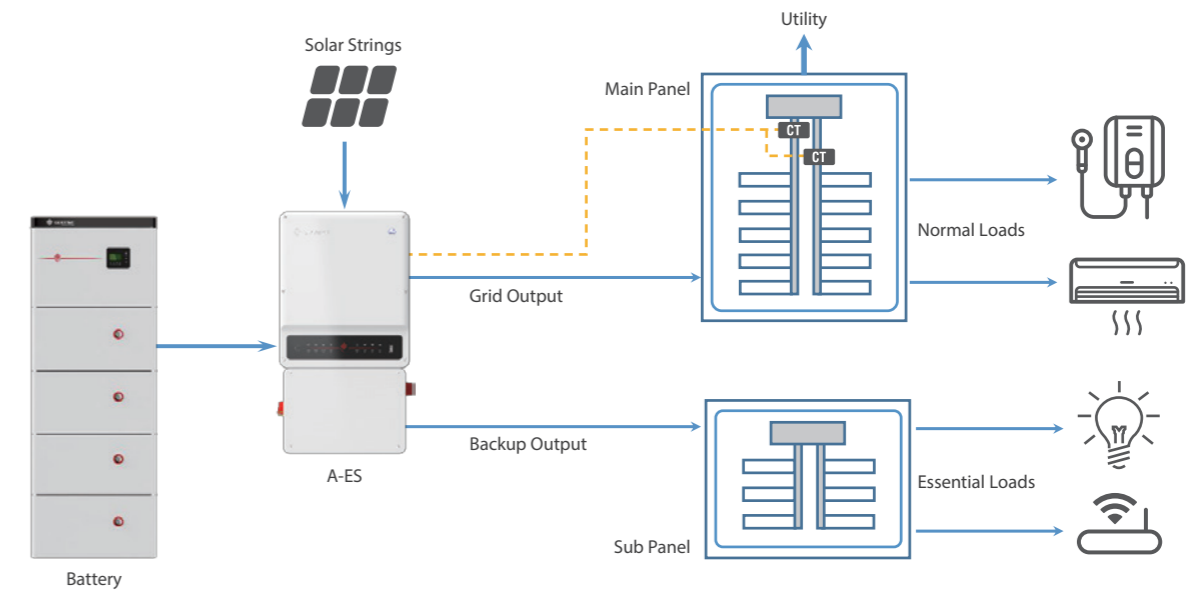
It follows the same principle of paralleling scenario: when the grid is available, the PV system, the batteries and the loads share the energy in an integrated system. In contrast, when an outage occurs, the paralleled system breaks into independent units in which the PV and the batteries supply backup power only to the corresponding loads. Paralleling solution is applicable for ET/BT series.

2.5 Split-Phase System Solutions (North America Only)

GoodWe developed the A-ES (hybrid inverter) and A-BP (AC-coupled inverter) series for the unique market demands (retrofit solution and split grid) in North America. Based on different customers' requirements, solutions are divided into two types: Partial Backup and Full Backup solution.

2.5.1 Partial Backup - DC-coupled (hybrid) Solutions

System Wiring

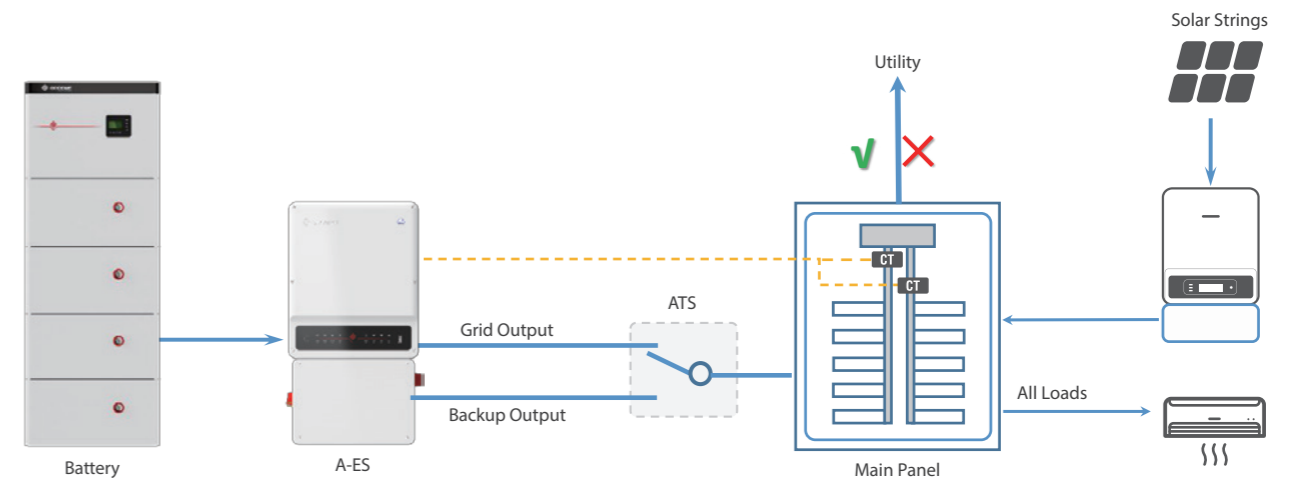


Operation Modes & Applicable Models

In Partial Backup solution, all household loads are divided into two parts: standard Loads (on-grid side) and essential loads (backup side). The default setting in A-ES series prioritizes PV generation to supply the loads, then charges the battery, and any surplus power will be exported to the grid. The battery will discharge to support loads when PV power is insufficient. If battery power is insufficient, the system will take power from the grid to support the loads. Solar Power will power essential loads on the backup side and charge the battery in the event of a grid outage. GoodWe A-ES series is the perfect match for this scenario.

2.5.2 Full Backup - AC-coupled Solution

System Wiring



Operation Modes & Applicable Models

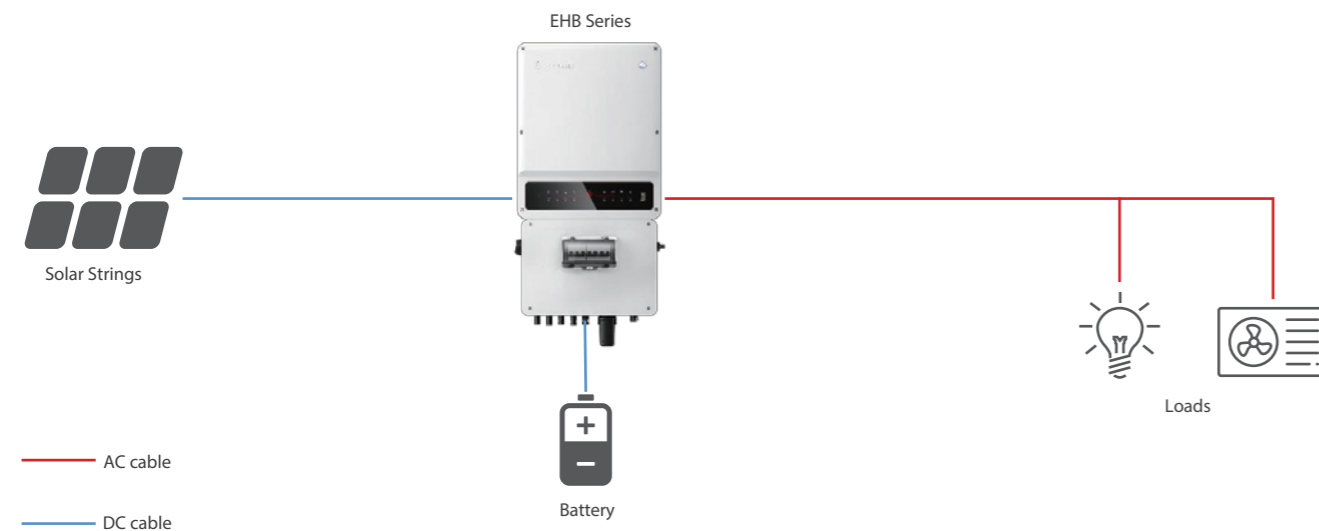
In Full Backup solution, all loads are connected to A-ES/ A-BP with an ATS (Auto Transfer Switch). Following a similar principle to the Partial Backup solution, the PV generation will first power the loads, then charge the battery and finally export any surplus power to the grid. If the grid fails, the ATS switches to backup output and all loads will be supplied by battery discharging. As long as the power grid is reconnected, the ATS will connect all loads to the on-grid side.

	A-ES	A-BP
Power Range	5-9.6kW	5-9.6kW
Grid Type	Split-Grid	Split-Grid
Lithium Battery	SECU-S (HV)	SECU-S (HV)
Accessory (Standard)	GM2000	GM2000

2.6 Off Grid Solution

Off-grid system is not simply an extension of the hybrid system, but an independent solution which is usually popular for pure off-grid scenarios where public grid is not available or for micro-grid systems. GOODWE has designed the EHB series with strong off-grid output capability to overcome issues such as unstable power source, battery over discharging and inrush current on the backup side.

System Wiring



Operation Modes & Applicable Models

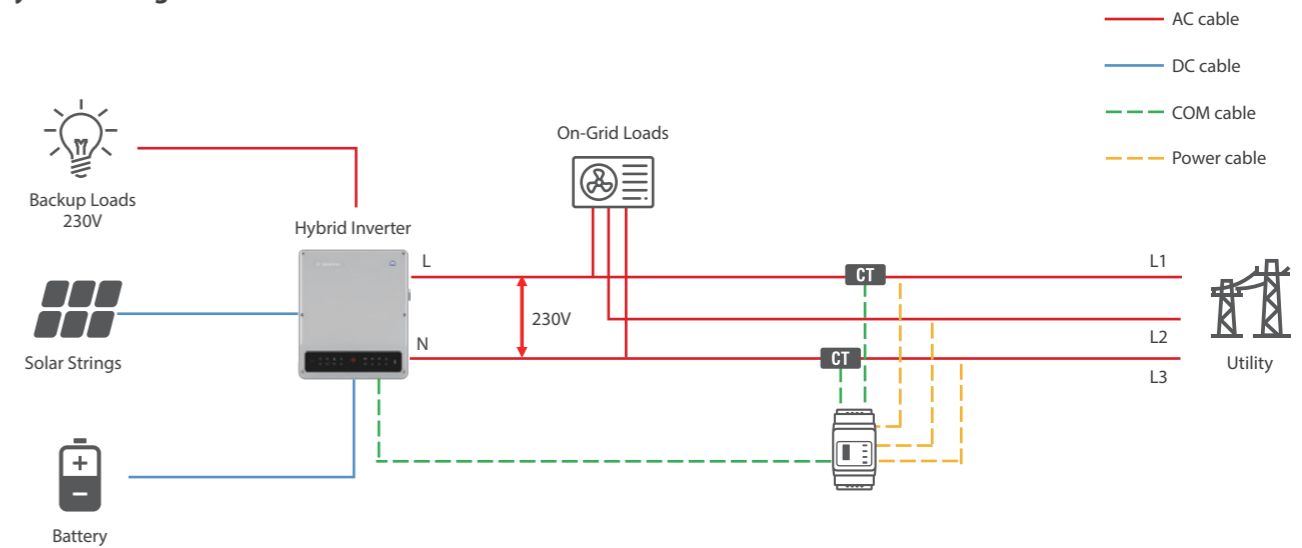
EHB series provides up to 10kW single phase output for both on-grid and backup side. A 20% overload capacity makes it compatible with different types of loads. In off-grid mode, solar power will support loads first then charge the battery. If solar power is insufficient, the battery will discharge to power home consumption. Customers can set the Depth of Discharge (off grid) to avoid excessive battery discharging. Aiming at the overload possibility on back up side, EHB series is equipped with overload protection and automatic recovery function.

	EHB
Power Range	5-10kW
Grid Type	Single-Phase
Lithium Battery	Lynx Home F Series (HV) Coming soon

2.7 Delta Grid Single-Phase Solution

Delta Grid is different to most European standard systems. In this case, GOODWE provides a single-phase solution with hybrid storage inverters. Therefore, the system wiring is completely different from wirings in other solutions.

System Wiring



Operation Modes & Applicable Models

In a similar way to the hybrid system, the default setting prioritizes PV generation, then charges the battery and any surplus power will be exported to the grid. If there is an outage during the day time, only the backup loads can be supplied with PV generation and battery discharging. GOODWE energy storage ES, EM and EH series are applicable for this special grid type.

Technical Data

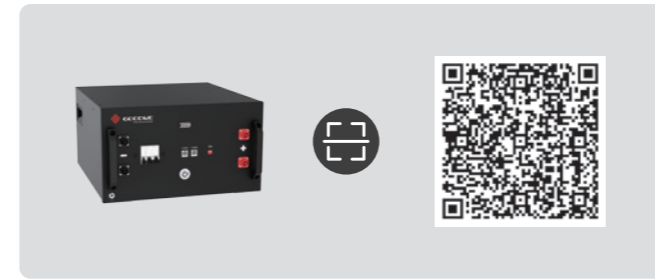
ET Series



EH Series



SECU-A Series



SECU-S Series



ES Series



EM Series



Lynx Home U Series



BT Series



BH Series



SBP Series



ESA Series



Product Strengths

Save money up to zero cost



Uninterrupted power supply, 8ms reaction



Up to 10 years warranty supported by strong bankability



Easy WiFi setup via remote APP settings



Fanless design, long lifespan



Charge battery @ off-peak price



International Awards and Rankings



2015-2020



2020



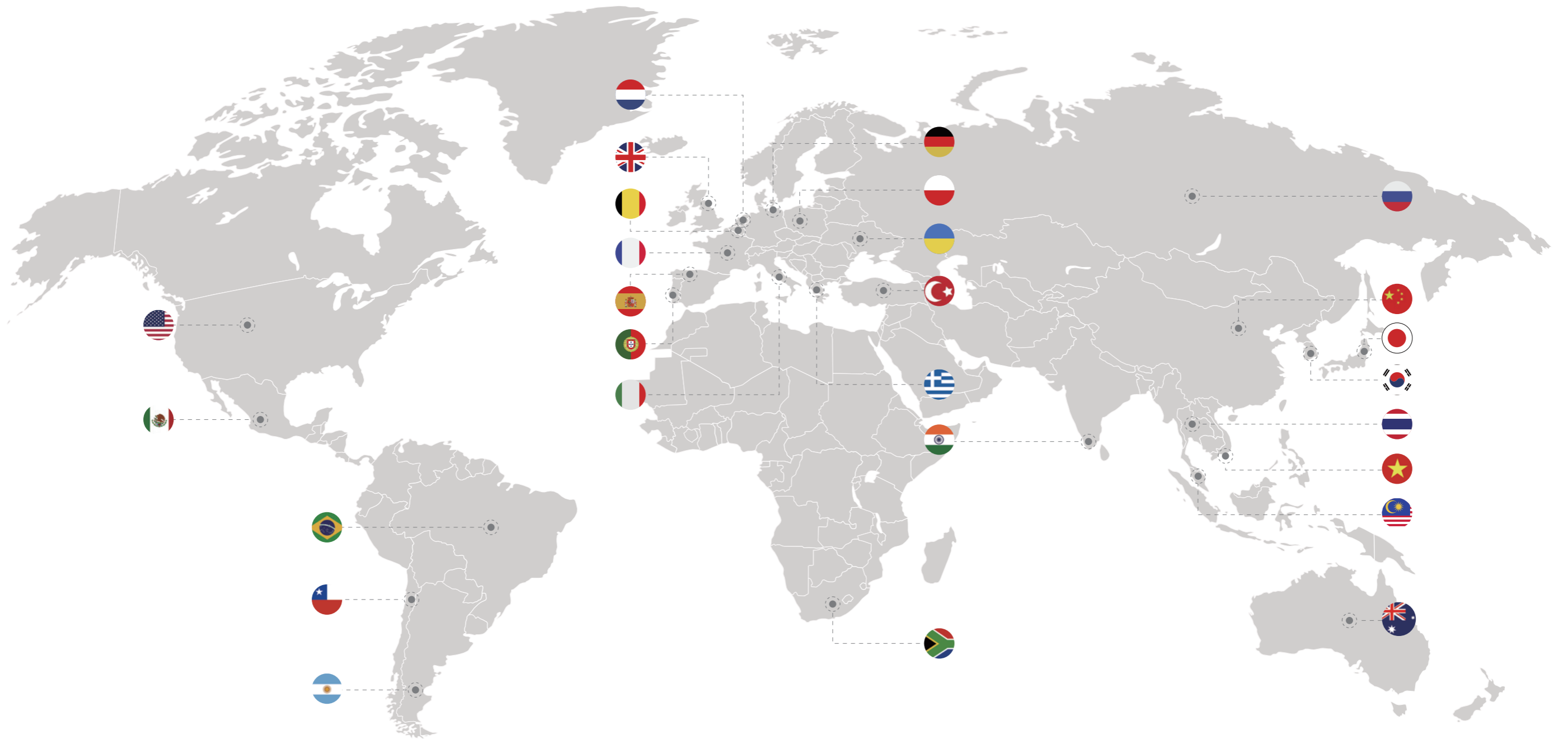
2017-2021



2021

Project Cases





Global Presence

EMEA

Germany
Netherlands
Turkey
Poland
Russia

EMEA

UK
Italy
Portugal
Spain
France

EMEA

Ukraine
Belgium
South Africa
Greece

LATAM

USA
Mexico
Chile
Brazil
Argentina

APAC

China
India
Vietnam
Australia

APAC

Japan
South Korea
Thailand
Malaysia

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