



Case Study

Jinko ESS SunGiga Liquid Cooled AC-Coupled System Solution for China Microgrid Project

1250kW/2610kWh Li-ion BESS Project in China

Project Overview

With the great pressure brought by the energy crisis and climate change, the realization of low-carbon transformation in the transportation field has reached consensus in various countries in the world. Electric are favored by governments all over the world for their advantages of cleanness, environmental protection and energy conservation. Thanks to multiple incentives such as policies and markets,

China's electric vehicle industry has developed rapidly in recent years, with the number of electric vehicles in the world leading the way.

At the same time, the development of electric vehicles cannot be separated from the construction of charging facilities network. However, on the one hand, a large number



of electric vehicles charging facilities connected to the power grid will have a certain impact on the safe operation of the power grid. On the other hand, from the point of view of the power source, electric vehicles have not realized the true zero emission of pollutants. The electric vehicles charging

station integrated photovoltaic and energy storage system can effectively alleviate the above problems and provide more clean energy while solving the problem of difficult charging of electric vehicles.

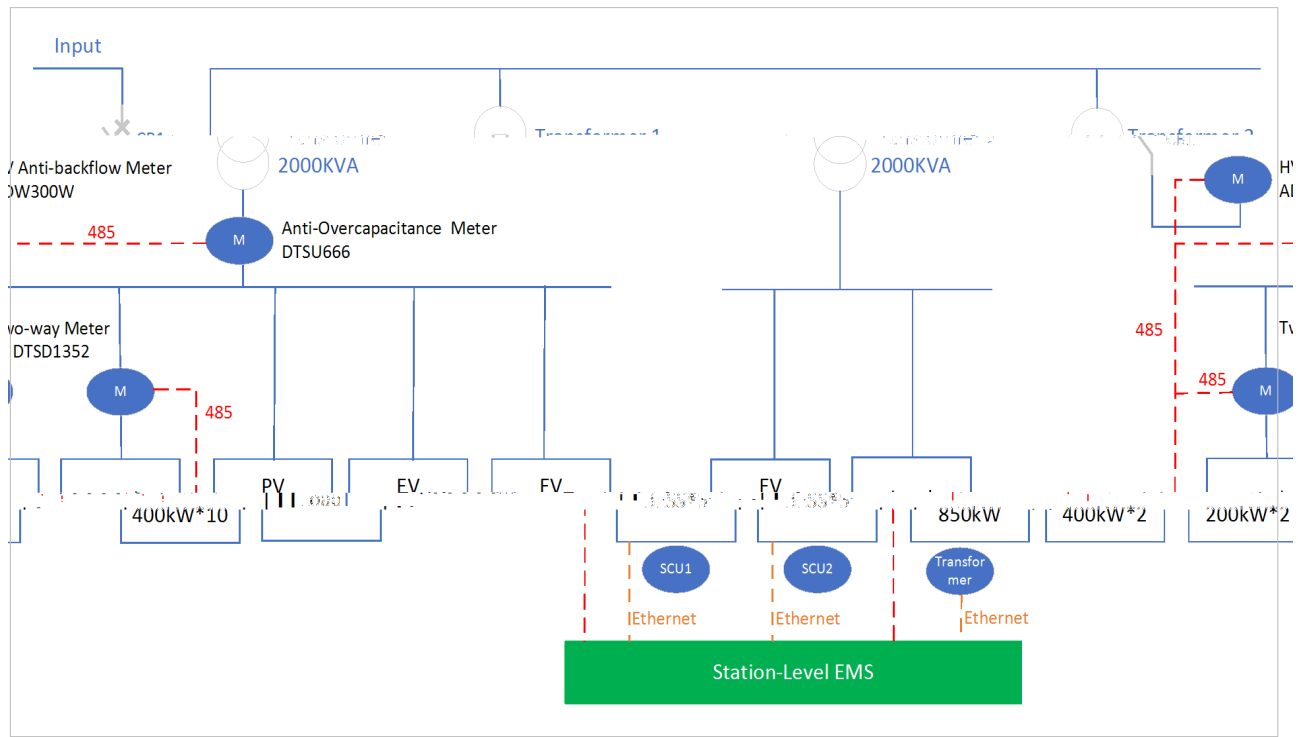


Fig. 1 Single Line Diagram of the System

The Solution

This project is located in Wuzhi, Jiaozuo city, Henan province. It is the first grid-connected photovoltaic storage and charging microgrid intelligent power station in Wwuzhi. The project is equipped with a 1250kW/2610kWh energy storage system, an 850kW photovoltaic system, as well as several heavy truck charging piles and small car charging piles.

There are a total of 2 units of 2000KVA transformers on site. Among them, Transformer 1 is connected to various devices:

- Two Acrel DTSU1352 two-way meters each correspond to five energy storage devices and the corresponding SCUs
- A CHINT DTSU666 electricity meter
- A 850kW PV device
- Two groups of EV charging piles of different power, with

capacities of 400kW*2 and 200kW*2 respectively.

Transformer 2 is connected to 10*400kW EV charging piles and domestic power loads.

The HV anti-backflow meter ADW300W is configured to monitor the power situation of the main incoming line, and the circuit is controlled to be on and off through the CB1 switch. The station-level EMS system communicates with the PCS via the CAN protocol, and with the anti-reverse flow meter and anti-overload meter via the Modbus_RTU protocol. Meanwhile, the data of the BMS is collected by the SCU and then transmitted to the station-level EMS. Ultimately, the anti-reverse flow and demand control functions for the 10kV main incoming lines throughout the

entire factory area will be realized, the power of each set of equipment will be coordinated and allocated, and the anti-overload control of the low-voltage access transformers of

each set of equipment will be achieved.

Operation Logic

The Jinko EMS system needs to communicate with the user's main switch cabinet, the energy storage PCS system, and the BMS system, simultaneously collect and monitor relevant information of the entire energy storage system, and control the charging and discharging of the energy storage system according to the "peak shaving and valley filling" strategy. By detecting the power consumption of the user's

main switch, the charging and discharging of the energy storage system and the power reduction of the photovoltaic inverter are controlled to balance the relationship between the user's load and photovoltaic power, ensuring that the photovoltaic and energy storage electricity is not sent to the power grid.



Fig. 2 Jinko ESS BESS Control Logic

1. The charging and discharging power of energy storage is controlled to achieve peak shaving and valley filling as well as to prevent photovoltaic power from being fed back to the power grid.

2. During the of-peak electricity consumption period at night, the energy storage is slowly charged to the capacity specified by the owner, and during the day, the remaining capacity is used to absorb excess PV generation. Try to use photovoltaic charging as much as possible. The energy management system tracks the operation of the photovoltaic

inverter and the status of the energy storage SOC online. Adjust the charging and discharging power of the energy storage according to the actual situation. Only when it is truly impossible to fully consume it should PV curtailment be executed.

3. Discharging operates in an anti-overload and anti-backflow mode. It is planned that during the day, the transformer, photovoltaic and energy storage power supply will jointly bear the load and maintain the normal operation of the system. Among them, the energy storage system exists

as a variable. Within its rated power range, its charging and discharging states depend on the load conditions. Absorb excess PV generation, supplement the power shortfall for

the load, disregard peak-valley arbitrage, and prioritize the stable operation of the loads.

The whole system is ensuring that the PV and energy storage electricity is not sent to the power grid. Effectively smooth out load fluctuations, achieve peak shaving and valley filling, and maximize the local consumption of new energy.

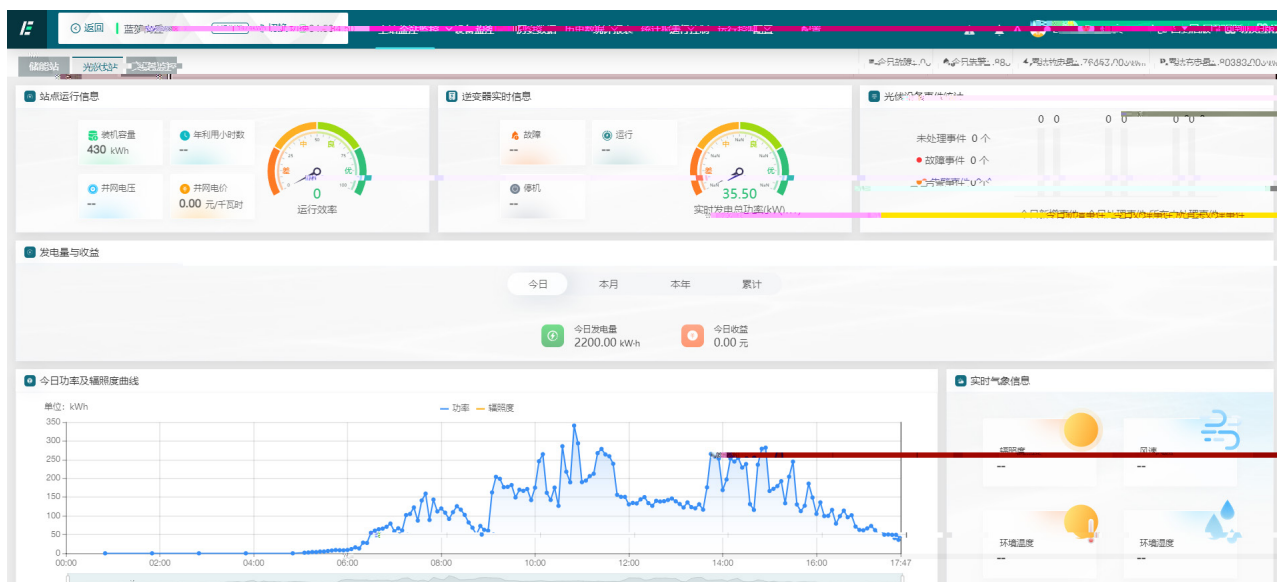
Dynamic virtual capacity expansion

It can achieve multi-unit parallel cycle control (it can cycle control based on the remaining power of each unit, and automatically adjust the operation sequence according to the charging and discharging time of each unit's energy storage. The system avoids running the equipment in a constant or fixed sequence, thus preventing the occurrence of unbalanced charging and discharging state of the equipment.)" And dynamic capacity expansion function (mainly when the transformer capacity is insufficient, it can

be expanded in real time by using energy storage).

Solve the problem of PV curtailment

PV power generation is mainly for self-use. If there is any surplus, it is stored in batteries. During the off-peak electricity consumption period at night, the energy storage is slowly charged to the capacity specified by the owner, and during the day, the remaining capacity is used for excess PV consumption. Try to use PV charging as much as possible. The energy management system tracks the operation of the PV inverter and the status of the energy storage SOC online. Adjust the charging and discharging power of the energy storage according to the actual situation. Only when it is truly impossible to fully consume it should the abandoned light control be carried out.



Flexibility in Energy Management

Jinko's self-developed EMS is adopted to coordinate and control the entire smart power station, maximizing the

utilization rate of each system and helping users earn the maximum benefit.



Fig. 4 Site Picture

* The report serves as a general overview and is subject to updates by Jinko ESS. Jinko ESS reserves the right to modify the content and holds the final authority in its interpretation.



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