

HOPEWIND

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Hopewind Energy Management System

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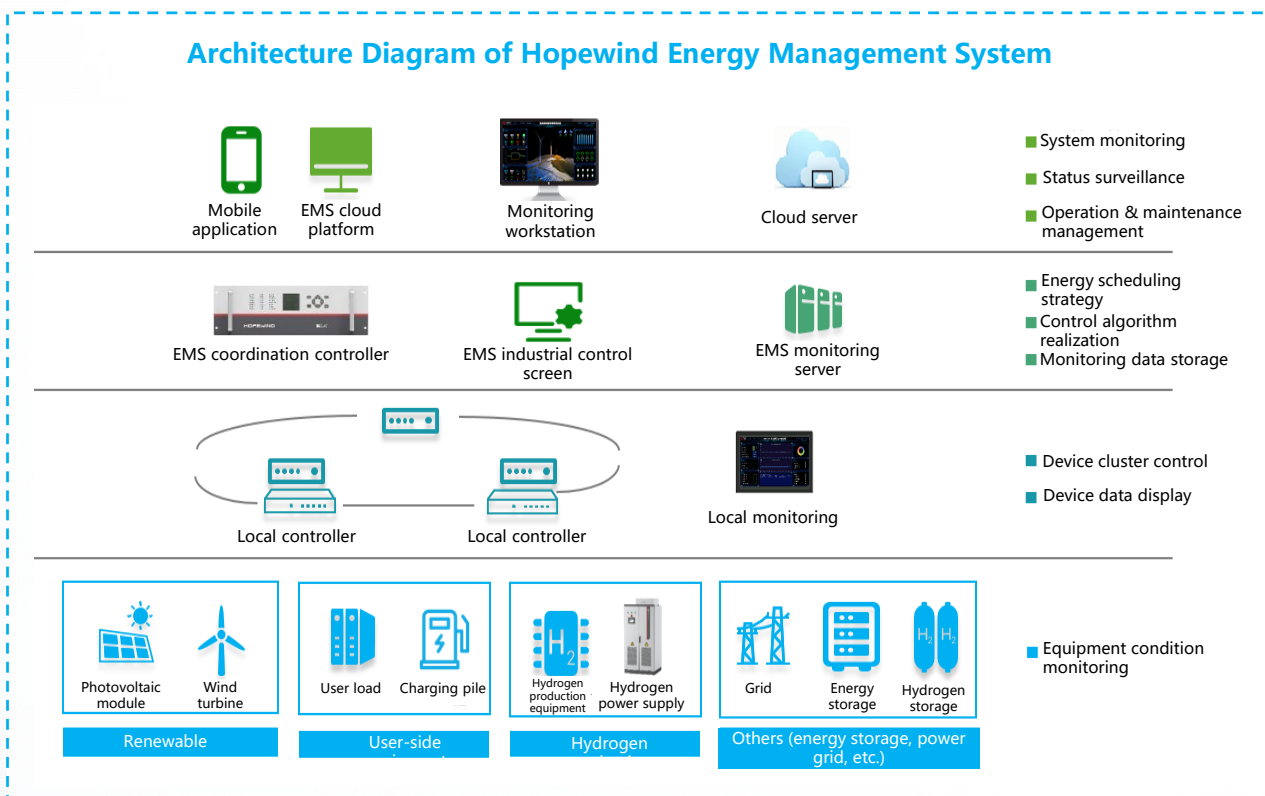
Hopewind Energy Management System

Introduction of the System

The construction of a new type of power system in China has been full-fledged and pushed forwards to an important period, so it requires great efforts to fully explore the resources for system flexibility adjustment from various aspects including power generation, grid, load and energy storage, in order to ensure the safe and stable operation of the system and the high proportion consumption of renewable energy. In response to the multi-source flexible scheduling and multi-device coordination and control requirements involved in scenarios of generation, Grid, load, and storage, our company offers safe, stable and reliable energy management system solutions. The solutions are designed with "software centralized architecture" and "hardware distributed architecture" to highly match the customer needs.

Hopewind Energy Management System is a comprehensive control center for distributed power supply, energy storage equipment and user-side equipment. With multi-source energy scheduling and multi-device coordinated control functions, it enables to deliver solutions for various application scenarios such as **renewable energy stations, energy storage power stations, micro-grid, and green power hydrogen production according to specific needs.**

Architecture Diagram of Hopewind Energy Management System



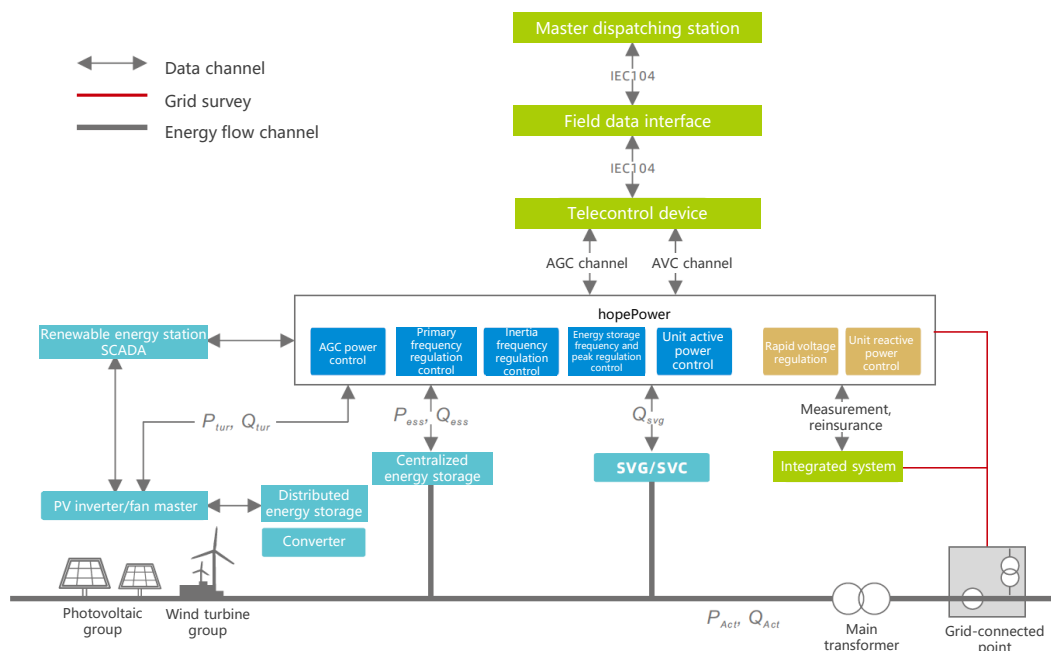
With highly modular design, Hopewind energy management system is characterized by customized strategy, customized configuration, cross-platform operation, etc. The system is compatible with multiple hardware platforms (industrial control computer, embedded industrial control screen) and operating systems (Linux, Windows, domestic Linx, etc.), so it can meet the requirements of operating environment in different application scenarios.






Renewable Energy Power Station EMS Solutions

Renewable energy power station energy management system is specially designed to address the instability and volatility between the renewable energy (such as wind and solar) power station and the power system. These stations are often challenged by frequency and voltage fluctuations, peak load clipping, and power system stability.

Hopewind renewable energy power station EMS works with the unit group control platform of the station (PPM/SCADA/EMS) to achieve AGC/AVC closed-loop control. The system offers the functions such as primary frequency modulation, inertia response, rapid voltage regulation, and coordinated control of wind/PV energy storage. The products are intended to improve the grid-related characteristics of renewable energy stations. They are in strict accordance with the technical specifications and requirements of each local power grid for renewable energy stations, demonstrating outstanding performance, stable and reliable operation.

Topology of the Renewable Energy Power Station EMS

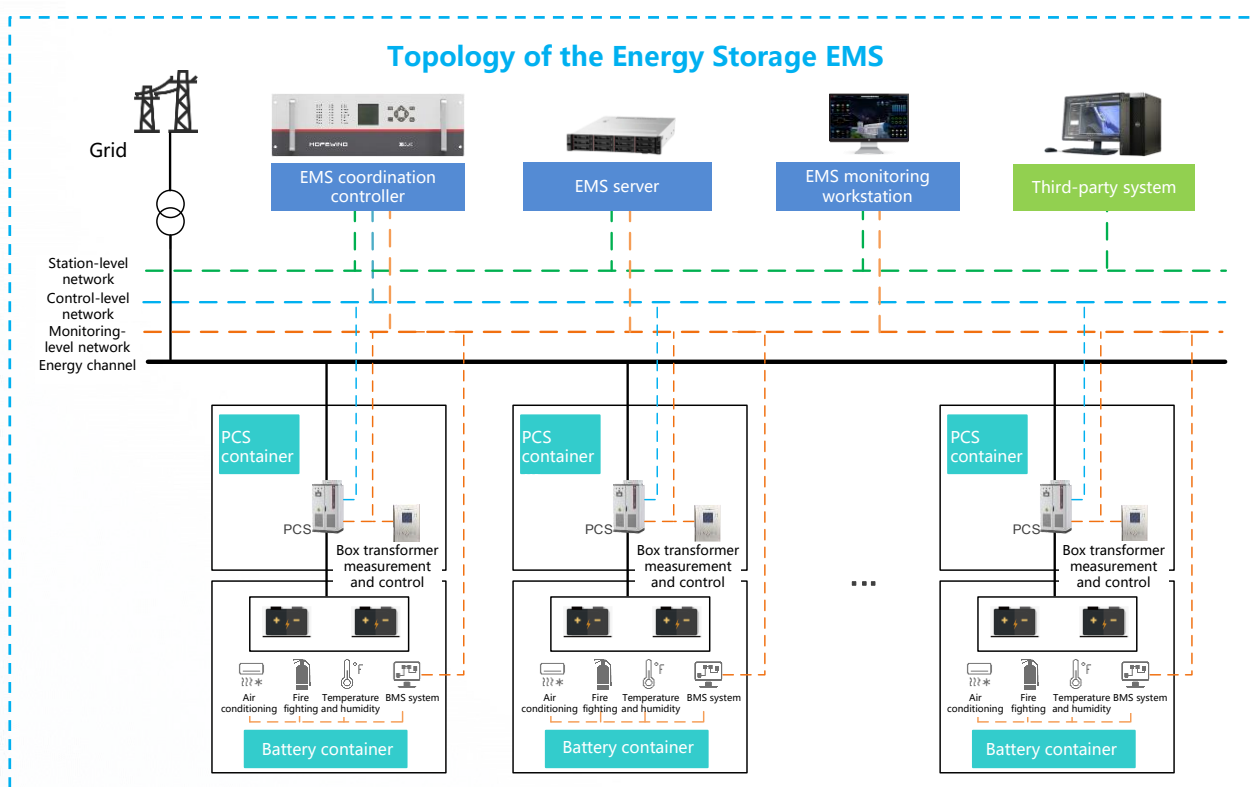







-  Suitable for renewable energy power station to improve the grid-connected characteristics of power station and ensure the power supply stability of power system
-  Support rapid frequency modulation, voltage regulation and coordinated control of wind and PV power storage to meet the requirements of local power grids
-  Support hot standby backup. The master and backup units support automatic data mirroring, monitoring to ensure reliable operation of the system
-  Support IEC101/104, Modbus, IEC61850 and other IEC communication protocols to satisfy different requirements of the project
-  Offer adaptive monitoring system and support test mode, suitable for frequency regulation, voltage regulation and other test items

Energy Storage EMS Solutions

Energy storage power stations are often deployed on the power generation side and the power grid side to meet the peak and frequency regulation requirements of the power system, featuring high energy storage capacity, multiple equipment and fast response. Energy management solutions to energy storage power stations are designed to realize coordinated control and real-time response of the energy storage system, and further improve the operational stability of power system, favorable for balancing the power supply and demand, improving the consumption of renewable energy and addressing the challenges of the power system.

Hopewind energy storage EMS supports centralized or hierarchical control architecture. Thanks to the embedded real-time operating system on its coordination controller, the system enables to support multi-channel GOOSE communication, so it is possible to realize the access and real-time control of a large number of energy storage converters (PCS). Hopewind provides EMS monitoring platform with C/S or B/S architecture as needed, delivering complete and mature solutions for energy storage power stations of different scales.

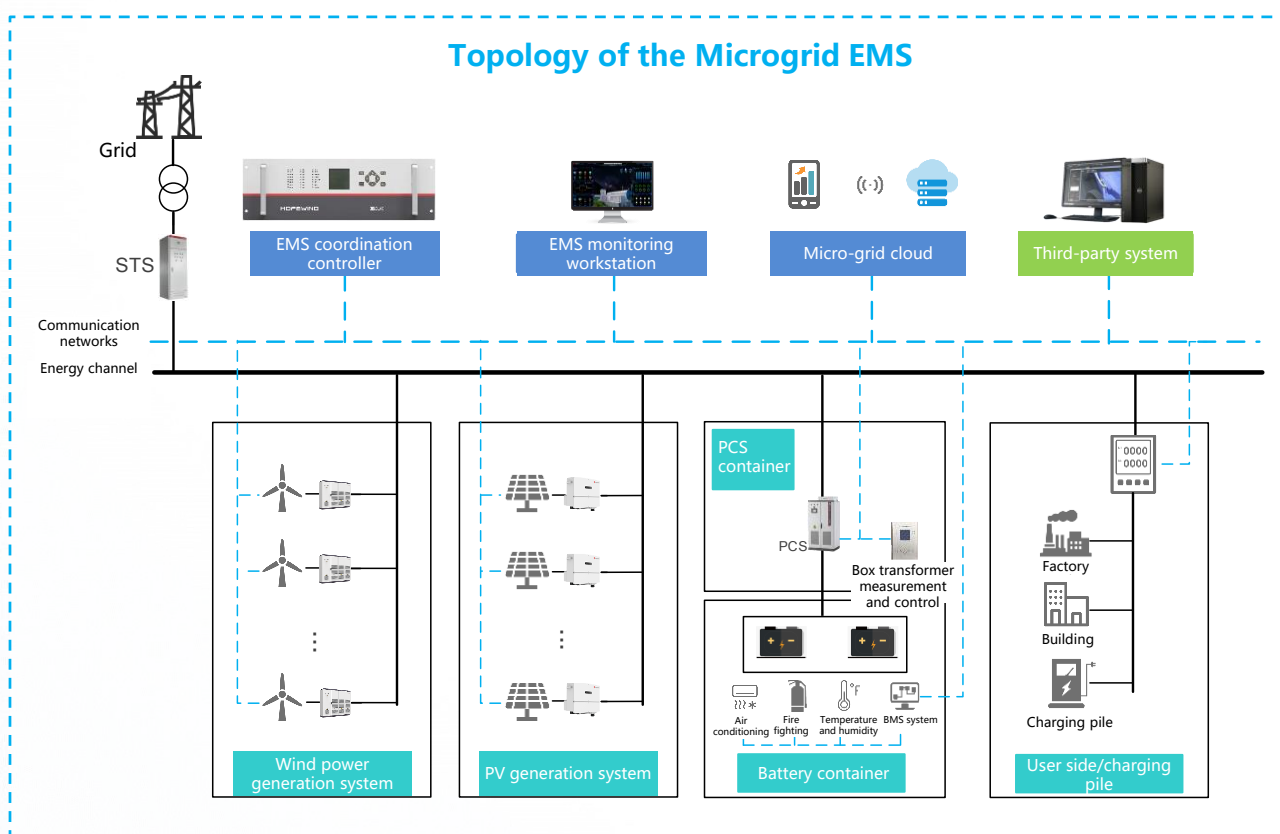






- 
Suitable for the energy storage power station of power generation side and power grid side to fulfill the frequency and peak regulation demand of power grid and improve the power supply reliability of power system
- 
Enable the coordinated control of over 100 energy storage PCS to effectively achieve SOC balance among multiple energy storage systems
- 
Have station, monitoring, and control-level networks that are mutually independent, and support dual network connection to ensure system communication stability and security
- 
Support C/S and B/S monitoring schemes, complete monitoring functions, and enable panoramic monitoring of the operating status of energy storage power station
- 
Support a variety of communication protocols and IEC61850 protocols, as well as customized strategies; highly adaptable to the project requirements

Microgrid EMS Solutions

Microgrid, a new type of network structure, is a system unit consisting of distributed power supply, energy storage device, energy conversion device, load and protection device, etc. Micro-grid can fully promote the large-scale access of distributed power supply and renewable energy, and achieve the highly reliable supply of various energy forms of load, so it has wide application prospects in isolated islands, urban areas and remote rural areas.

Hopewind microgrid EMS system serves as the brain and control center of micro-grid, and the software is highly modular. It supports customized system configuration and customized strategies such as off-grid and grid-connected control logic, which can meet the needs of micro-grid configuration in different system. Besides, Hopewind micro-grid EMS system also supports cloud platform deployment to realize remote monitoring, maintenance and management.

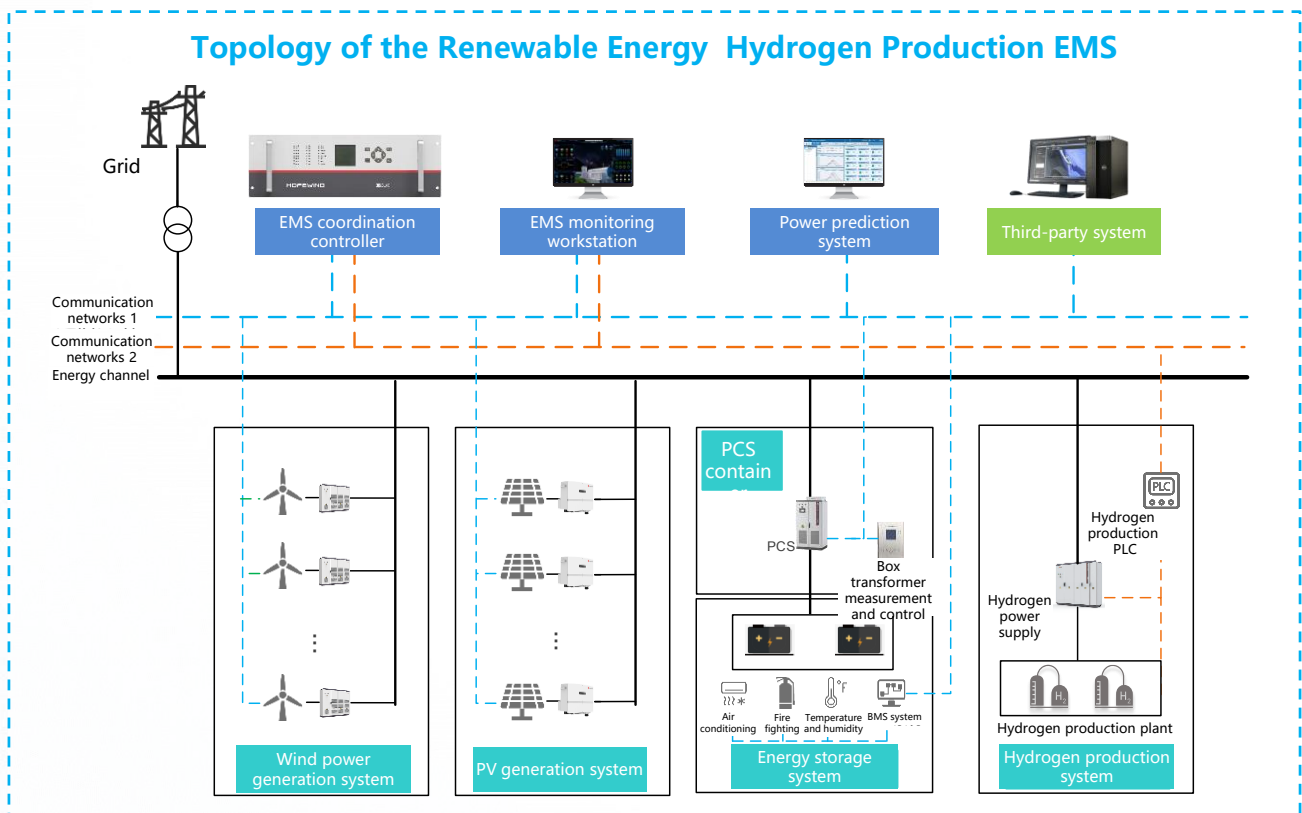


- 
Suitable for off-grid and grid-connected micro-grids in scenarios involving multi-energy complementation, spontaneous self-use, and remote areas without electricity
- 
Applicable for micro-grids of different scales in offering industrial control screen, coordination controller and other schemes for project cost reduction
- 
With modular design, the system can provide customized configuration and strategies to a specific project, and seamlessly meet the the project needs
- 
Support localized deployment and cloud platform management, making unattended and remote maintenance possible

Renewable Energy Hydrogen Production Energy Management Solutions

Green power hydrogen production is to produce hydrogen directly from solar energy, wind energy and other renewable energy, and there is hardly greenhouse gases produced in the production process, but renewable energy power generation presents intermittence and fluctuation. Therefore, energy management system is employed to ensure the production, storage and utilization of renewable energy, and guarantee the stable operation of the power system and reliable power supply of hydrogen production equipment.

Hopewind renewable energy hydrogen production EMS supports multi-source energy scheduling and multi-equipment coordinated control, and it customizes green power hydrogen production control strategy to address the control characteristics and boundary constraints of hydrogen production equipment. In this way, it can realize the efficient use of renewable energy, secure the safe and reliable operation of hydrogen production system, maximize the hydrogen production efficiency, and provide visualized monitoring of green hydrogen production system.



Suitable for hydrogen production in renewable energy stations, microgrid hydrogen production and pure off-grid hydrogen production



Calculate the hydrogen production planning curve based on power prediction to improve renewable energy consumption and hydrogen production efficiency



Stabilize the fluctuation in renewable energy power generation and reduce the influences of renewable energy power generation on hydrogen production system



Use the control algorithm considering the operation characteristics of hydrogen production equipment, ensuring the reliability of hydrogen production system and prolong the service life of equipment



Deliver the system architecture and networking scheme of multi-source energy scheduling and multi-device coordination control

Production Design

Hopewind energy management system is equipped with customized embedded real-time control platform. The control platform works in the "Real-time core + Communication core" mode, and enables real-time control and communication. It supports millisecond-level control tasks and rapid communication of various device, or seeks expansion of the number of control objects by virtue of the hierarchical control mechanism, thus meeting the needs of different application scenarios.



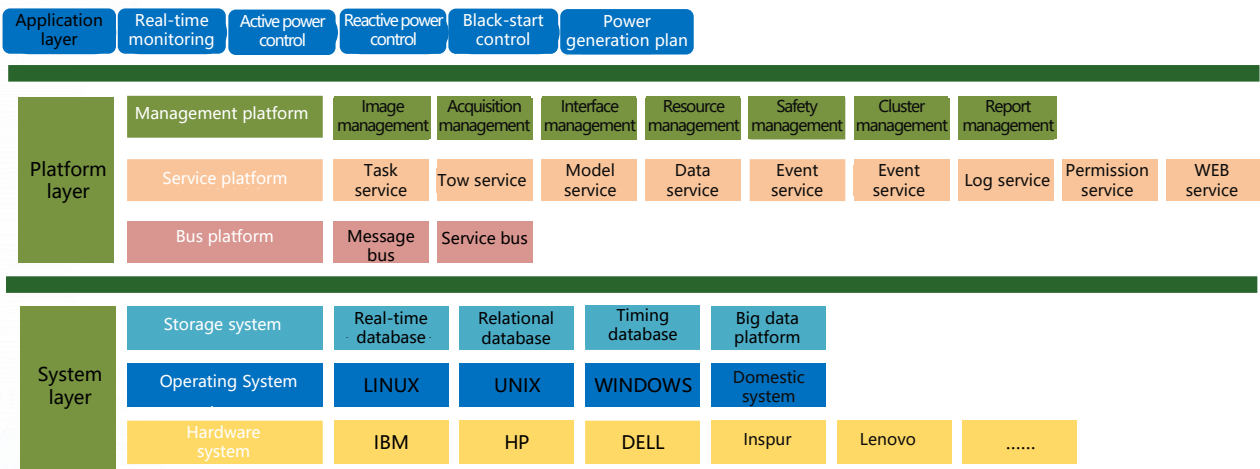
EMS coordination control unit

Specifications

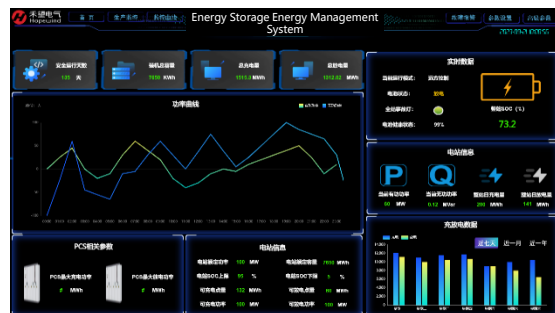
Specifications			
Power supply	220Vac / 50Hz (dual power)	Communication protocol	Modbus TCP/RTU、IEC101/104、IEC61850 (GOOSE、MMS)
Communication interface	4*RJ45、2*RS485、6*SFP (GOOSE)	Acquisition channel	Support six-channel power acquisition
IO interface	16*DI、8*DO、8*AO	Measurement accuracy	Frequency measurement accuracy $\leq 0.001\text{Hz}$, voltage and current measurement level 0.2
Operating System	Embedded Unix, Linux	Timing mode	In case of NTP and IRIG-B time code standards, the timing error should be $\leq 1\text{ms}$
Working temperature	-40°C to +65°C	Hot standby backup	Switching time $\leq 100\text{ms}$
Storage temperature	-45°C to +85°C	Dual networking	Support networking of network A and Network B via different protocols
Relative humidity	0-95%, no condensation, no icing	Fault detection	Support fault self-test and self-startup
Protection grade	IP30	SOE recording	$\leq 1\text{ms}$ for devices on the same space layer

EMS Monitoring Platform

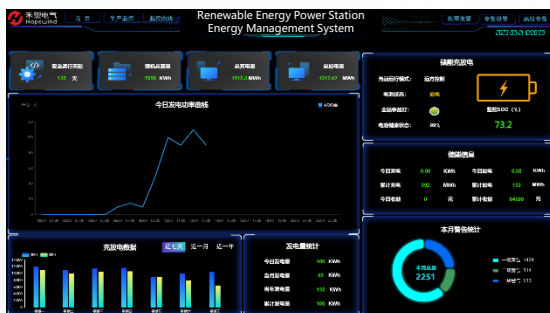
Hopewind EMS energy management system monitoring platform is developed to improve the energy efficiency, reduce the cost, ensure the compliance, promote sustainability and provide data support so that companies and institutions can better manage and optimize their usage of energy. The new generation of monitoring platform supports a variety of application scenarios on the user side and power grid side, software integrated SCADA, graphical model integration, topology management analysis, modular design, configuration design and other cutting-edge application technologies. It is able to provide complete and mature solutions for the monitoring of renewable energy stations, energy storage stations, micro-grids and hydrogen production stations of different scales.



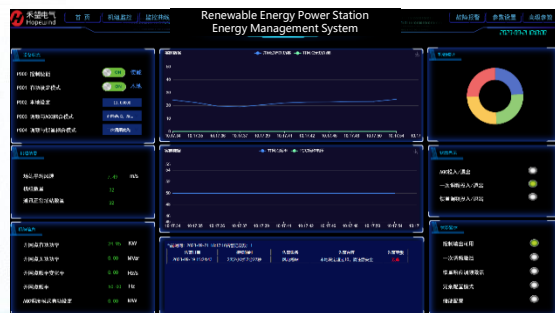
Renewable energy hydrogen production EMS monitoring



Energy storage EMS monitoring



Renewable energy distribution and storage monitoring



Renewable Energy Power Station EMS monitoring

System Features and Functions

01

Stable operation

The control platform employs high-performance chip and real-time operating system, so the software and hardware are highly stable

02

Efficient and reliable

Adopt the software of modular design; support customized strategy, power distribution optimization, high control accuracy; support fault locating, recording and historical querying

03

Green power hydrogen production planning curve

Work out the hydrogen production planning curve according to renewable energy power prediction and system equipment status, to improve the hydrogen production efficiency

04

Support hot standby backup configuration

Support master and backup configuration and automatic master/backup switching to improve the system reliability

05

Multi-scenario applications

Offer solutions for various application scenarios such as power generation side, power grid side, user side and hydrogen production

06

Integrated architecture design

Customized integration and integrated design of various function modules

07

Support customized strategies

Support conventional control mode selection, automatic/manual adjustment, and also support customized strategy development to the customer needs

08

Quick response function

Receive the power control instructions from the upper system, enable fast processing of the energy storage system, and the delay in execution of power instruction is <20ms

09

Rapid frequency regulation function

Support real-time monitoring of the frequency at grid-connected points, adjust the system active power autonomously according to the primary frequency regulation drooping curve to meet the requirements of relevant specifications

10

Planning curve tracking

Support customized charging and discharging strategies at an interval of 5 minutes to obtain peak valley price spread arbitrage

11

SOC-balanced control

Through smart power distribution, optimize the SOC differences between batteries to achieve balanced status of the energy storage systems

12

Off-grid and on-grid switching

Through real-time monitoring of off-grid and grid-connected device status, switch the off-grid and grid-connected control strategies; support different operation modes

To promote technological progress in the industry
and create a better life for mankind



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If the product size and parameters have changed, the latest actual product shall prevail