HOPEWIND

Stock Code: SSE-603063

Hydrogen Production Power Supply

Product Manual

www.hopewind.com

About Hopewind

01

Renewable Energy Field

In the field of wind power, Hopewind Provides 750kW~30MW wind Power converters, Pitch Inverter, Yaw Inverter, and Energy Management System, etc.

In the field of solar power, Hopewind Provides 3kW~385kW PV grid-tied inverters and 3000kVA~9000kVA MV Transformer Station.

In the field of energy storage, Hopewind provides 145kW~250kW power conversion system, 1MW~10MW PCS turnkey station as well as EMS and other equipments, which widely used in generation side, grid side,user side and microgrid side.

In the field of hydrogen energy, Hopewind Provides 500kW~20MW IGBT hydrogen production power supply and Intelligent Hydrogen Management System,applicable to various scenarios such as on-grid AC and off-grid DC.

02

Special Power Supply Field

Provide 500kVA~150MVA multifunctional grid simulators, which can be used in wind power, photovoltaic, energy storage, hydrogen energy, SVG, and other fields.

03

Power Quality Field

Provide 1Mvar~140Mvar STATCOM products, which have been widely used in regional grids, wind power, photovoltaics, petrochemicals, coal, steel, oil fields and rail transit and other fields and industries.

04

Electric Drive Field

Provide a complete set of 0.75kW~22.4MW low-voltage and 4MVA~102MVA (single inverter) medium-voltage variable frequency drive solutions, widely used in metallurgy, petroleum and petrochemical, mining machinery, port cranes, distributed energy power generation, large-scale test platforms, marine equipment, textiles, chemicals, cement, municipal and other various industrial applications.

Shenzhen Hopewind Electric Co., Ltd. (Stock Code: 603063) focuses on the R&D, manufacturing, sales and services of renewable energy & electric drive products, including products for wind power generation, photovoltaic generation, energy storage, hydrogen production power supply products, special power supply, power quality and electric drive. Furthermore, Hopewind owns integrated independent R&D and testing platforms of high-power power electrical equipment and monitoring systems. Through innovation in technology and service, Hopewind continuously creates value for customers, and has become one of China's most competitive enterprises in the renewable energy field.

6 R&D and manufacturing bases

Shenzhen, Suzhou, Xi'an, Heyuan, Wuhan, Hungary

30+ global service bases

Deployed worldwide to provide comprehensive services for global customers

Headquarter
Shenzhen

Hydrogen Energy Products

Overview of Hydrogen Energy Products
AC/DC Single-stage Topology IGBT Power Supply
AC/DC+DC/DC Two-stage Topology IGBT Power Supply

Overview of Hydrogen Energy Products

Product Overview

Hopewind HHP series water electrolysis hydrogen production power supply products adopt a fully-controlled IGBT topology for the main power topology and a modular redundancy design. Building on and drawing on the company's extensive experience and successful applications in new energy power generation and high-power drive fields, the product comes with excellent grid adaptability and rapid power response characteristics, suitable for various types of electrolyzers and applicable in diverse grid-connected /off-grid new energy hydrogen production scenarios.

Naming Rules

HHP - 6600 - 740 - A / I / N

Product Name:
Hopewind Hydrogen Production Power Supply

Rated Output Current:
6600A

Rated Output Voltage:
740Vdc

Cooling Method:
A: Air cooling, L: Liquid cooling

Place:
I: Indoor, O: Outdoor container

Altitude:
N: Normal, P: Plateau, U: Ultra Plateau

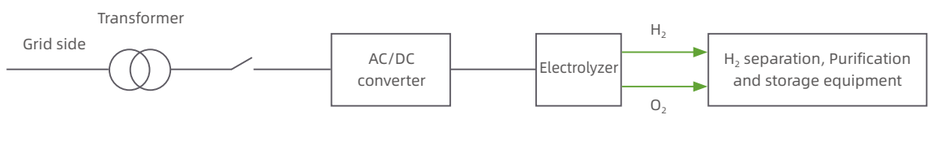
Typical Power Supply Cabinet

AC/DC Single-stage Topology IGBT Power Supply

Performance & Features

- Suitable for 0~1500V electrolyzer
- Regulation with a wide power range of 10~110% and fast response
- High power factor of above 0.99 (≥30%P_n) and reactive power support as needed
- Good grid-involved characteristics, with grid harmonic current THDi ≤3%
- High efficiency in full power range, efficiency exceeds 97% (above 30% P_n), maximum efficiency 98.5%
- Good parallel characteristics and easy system expansion
- Supporting air cooling/liquid cooling and easy maintenance

Product Working Principle



Technical Parameters

Product		AC/DC Single-Stage Topology Series
DC Parameters	Output Voltage Range	≤1500V
	Output Current Range	Meeting customized needs
	DC Voltage Ripple	≤1%
	DC Stabilized Current Precision	±0.5% (steady state)
	DC Stabilized Voltage Precision	±0.5% (steady state)
	Load Response Time	<0.1s (0%~100% load, running state)
	Output Control Mode	Current control (default), Voltage control, Power control
AC Parameters	Input AC Voltage Range	≤900V
	Rated Operating Frequency	50Hz / 60Hz
	Rated Power Factor	>0.99 (over 30%P_n)
	Adjustable Power Factor Range	-0.95 Lead~0.95 Lag
	Allowable Grid Frequency Deviation	±10%
	Allowable Grid Voltage Deviation	±10%
	Total Harmonic Distortion Rate of Grid-connected Current	<3% (over 30%P_n)
	Access Method	3-phase 3-wire+PE
System	Wiring In / Out Mode	Meeting customized needs
	Efficiency	Maximum efficiency 98.5%
Environmental Requirements	Cooling Method	Temperature-controlled air cooling / Liquid cooling
	Working Temperature Range	-40℃~+55℃
	Electromagnetic Environment Category	Class A
	Relative Humidity	0%~95% (no condensation)
	Enclosure Protection Rating	IP23 / IP54
	Highest Altitude of Installation Site	4000m
External Communication	External Communication Interface	RS485, Ethernet and 4mA~20mA digital analog, etc.
	External Communication Protocol	Modbus RTU, Modbus TCP
Display	HMI	Touch screen (optional)

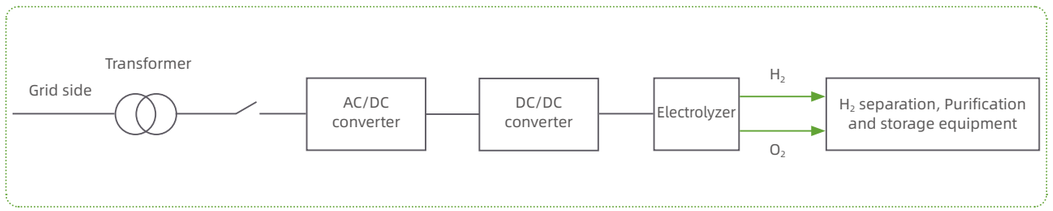
AC/DC IGBT

AC/DC+DC/DC Two-stage Topology IGBT Power Supply

Performance & Features

- Suitable for 0~1000V electrolyzer
- Regulation with a wide power range of 10~110% and fast response
- High power factor of above 0.99 (≥30%P_n) and reactive power support as needed
- Good grid-involved characteristics, with grid harmonic current THDi ≤3%
- High efficiency in full power range, efficiency exceeds 96% (above 30% P_n), maximum efficiency 97.5%
- Good parallel characteristics and easy system expansion
- Supporting air cooling/liquid cooling and easy maintenance

Product Working Principle



Technical Parameters

Product		AC/DC+DC/DC Two-stage Topology Series
DC Parameters	Output Voltage Range	0V~1000V
	Output Current Range	Meeting customized needs
	DC Voltage Ripple	≤1%
	DC Stabilized Current Precision	±0.5% (steady state)
	DC Stabilized Voltage Precision	±0.5% (steady state)
	Load Response Time	<0.1s (0%~100% load, running state)
	Output Control Mode	Current control (default), Voltage control, Power control
AC Parameters	Input AC Voltage Range	380V~690V
	Rated Operating Frequency	50Hz / 60Hz
	Rated Power Factor	>0.99 (over 30%P_n)
	Adjustable Power Factor Range	-0.95 Lead~0.95 Lag
	Allowable Grid Frequency Deviation	±10%
	Allowable Grid Voltage Deviation	±10%
	Total HarmonicDistortion Rate of Grid-connected Current	<3% (over 30%P_n)
	Access Method	3-phase 3-wire+PE
System	Wiring in / Out mode	Meeting customized needs
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	Electromagnetic Environment Category	Class A
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	External Communication Protocol	Modbus RTU, Modbus TCP
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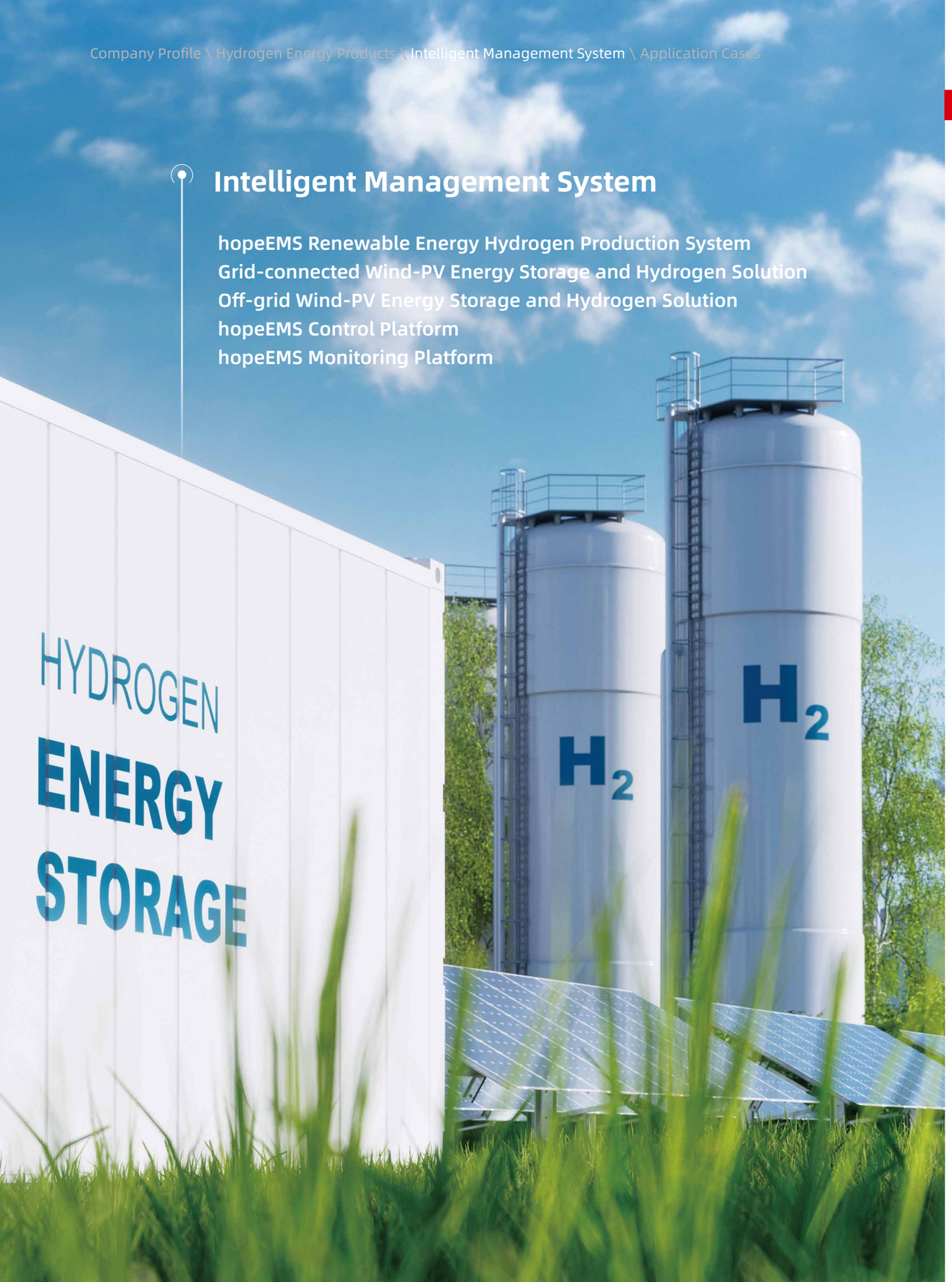
AC/DC+DC/DC IGBT

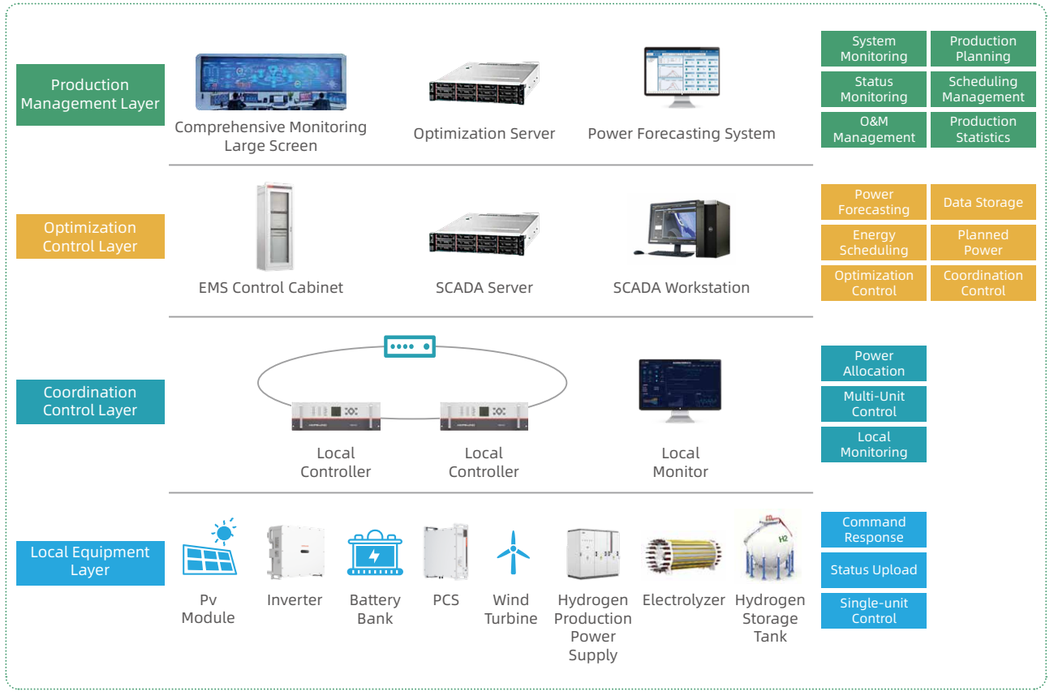


Intelligent Management System

hopeEMS Renewable Energy Hydrogen Production System
Grid-connected Wind-PV Energy Storage and Hydrogen Solution
Off-grid Wind-PV Energy Storage and Hydrogen Solution
hopeEMS Control Platform
hopeEMS Monitoring Platform

hopeEMS Renewable Energy Hydrogen Production System

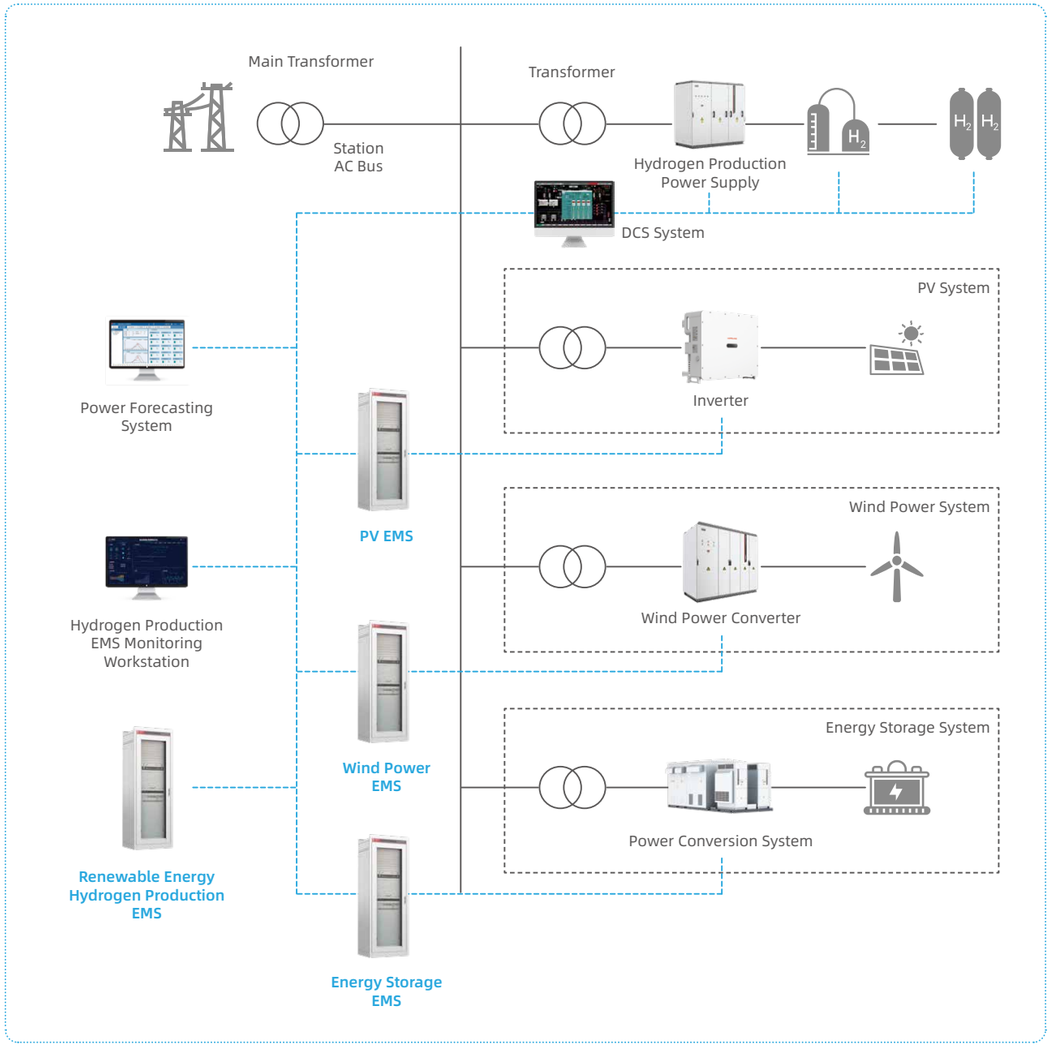
System Architecture



Solution Features

- Flexible adaptation: Supporting islanded-grid and grid-connected operation, fully adaptable to different system scales and configurations in new energy hydrogen production scenarios.
- Multi-energy integration: Achieving coordinated control of source, grid, load, and storage, ensuring safe, stable, and economical microgrid operation.
- Intelligent planning: Based on multi-dimensional objective optimization, intelligently generating power generation and hydrogen production schedules across multiple time scales.
- High-efficiency hydrogen production: Balancing energy and hydrogen supply through control algorithms, improving renewable energy utilization and reducing hydrogen production costs.
- Cluster control: Optimizing cluster control based on electrolyzer operational characteristics, improving hydrogen production efficiency and health status of electrolyzers.
- Safe production: Implementing predictive control based on rapid fault detection and diagnosis, improving system stability margin.

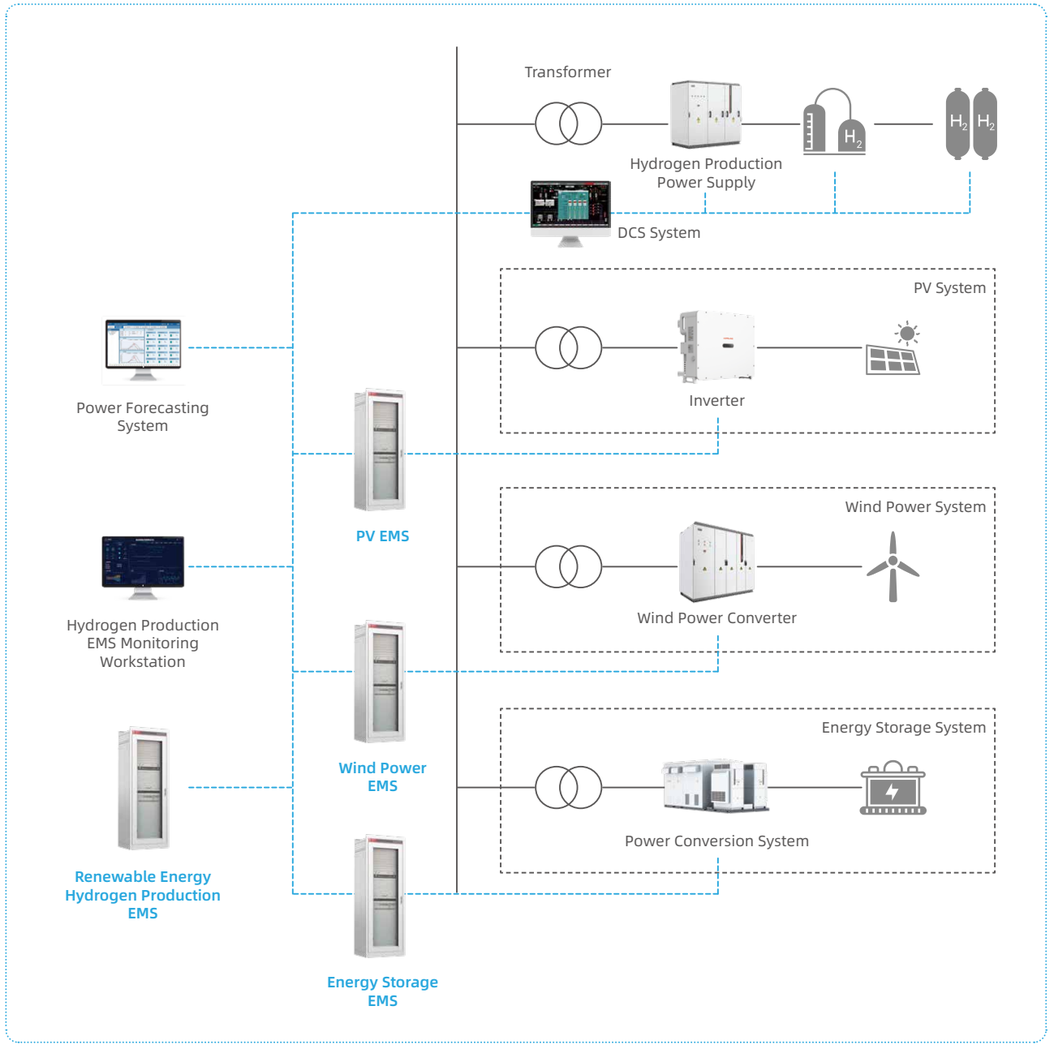
Grid-connected Wind-PV Energy Storage and Hydrogen Solution



Solution Advantages

- Cost optimization: Flexible energy storage configuration, enabling effective reduction of electricity costs for renewable energy hydrogen production.
- Grid-friendly: Capable of integrating with grid dispatch to support stable grid operation.
- Safety and stability: Providing grid support for frequency and voltage, enhancing overall system stability margin.

Off-grid Wind-PV Energy Storage and Hydrogen Solution



Solution Advantages

- System flexibility: Flexible system configuration balances economic and stability requirements.
- Independence: Self-contained grid forming, not constrained by external grids, ensuring high autonomy.
- 100% hydrogen: Fully utilizing renewable energy, achieving zero-carbon emissions throughout the hydrogen production process.

hopeEMS Control Platform

hopeEMS

1 High Efficiency and Reliability

- Controllers use real-time operating systems for fast response and stable operation.
- Software design is highly modular, enabling independent function execution and reducing failure risks.
- Seamless switching is implemented through dual-machine hot standby, ensuring continuous and stable system operation.

2 Flexible Adaptation

- Equipped with multiple types of communication interfaces like RS485 and Ethernet interfaces, boasting strong expandability.
- Supporting Modbus, IEC 104, IEC 61850, GOOSE, DNP 3.0, and other protocols.
- Compatible with wind, solar, diesel, energy storage, and load equipment from different manufacturers.

3 Integrated Deployment

- Using standard electrical protection cabinets, suitable for various industrial environments.
- Providing integrated, one-stop delivery to enable rapid deployment and commissioning.

Technical Parameters

Model		HEMS100
System	Configuration	Controller, switch, sever, communication management unit, cloud gateway, etc
Communication Interface	RS485	2
	RJ45	12
	DI	8
	DO	8
Power Supply	Input Voltage	100~240VAC
	Rated Frequency	50Hz / 60Hz
	Operating Power	300~800W
Environment	Operating Temperature	-20~60℃
	Storage Temperature	-30~70℃
	Protection Degree	IP20
	Installation Site	Indoor
Communication	Communication Cable	Twisted Pair Cable, Ethernet Cable, etc
	Communication Protocol	Modbus TCP, Modbus RTU, IEC104, IEC 61850, GOOSE, DNP3.0, etc
	Cloud Migration Mode	LAN, 4G, Wi-Fi (2.4GHz)
Appearance	Dimensions (H*W*D)	2260*800*600mm
	Weight	250~350kg
	Door Opening Mode	Front right-opening door (hinge on the left), rear double-opening door
	Cable Entry/Exit Method	Down Line In and Out
	Installation Method	Floor-mounted

hopeEMS Monitoring Platform

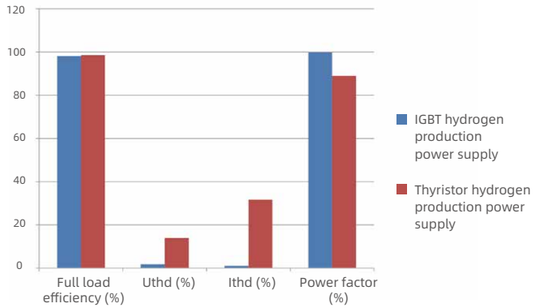
Solution Features

- Flexible deployment: A "cloud-network-edge" digital O&M architecture is adopted to achieve integrated operation management and intelligent scheduling.
- Data supercomputing: Monitoring servers support massive data acquisition, storage, statistics, computing, and analysis.
- Compatibility and reliability: Compatible with Windows, Linux, and other operating systems developed by China, featuring high security and reliability.
- Technology integration: Cutting-edge technologies such as SCADA, integrated graphical modeling, topology management and analysis, modular design, and configuration design are integrated.
- Panoramic monitoring: Second-level data acquisition and visualization and massive data access and storage are supported and combined with high-standard human-machine interaction.
- Intelligent O&M: Digital statistics and efficient analysis are supported, O&M upgrade is simplified, and fault alarming and rapid fault locating are provided.

Application Cases

1 Application in Yunnan

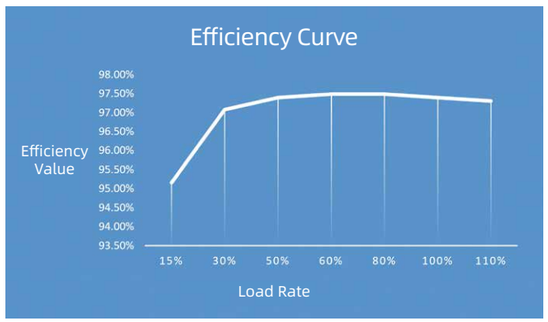
- Hopewind hydrogen production power supply HHP-16000-170 matched with a Low-Voltage and High-Current (170V/16000A) hydrogen production electrolyzer was applied by a PV module manufacturer in Yunnan.
- The product parameters are designed as per the altitude of 3000 meters, and the equipment operates stably. The Ithd, Uthd and power factor of the IGBT hydrogen production power supply significantly outperform those of the thyristor hydrogen production power supply, as demonstrated by lower system harmonic loss and better grid adaptability.

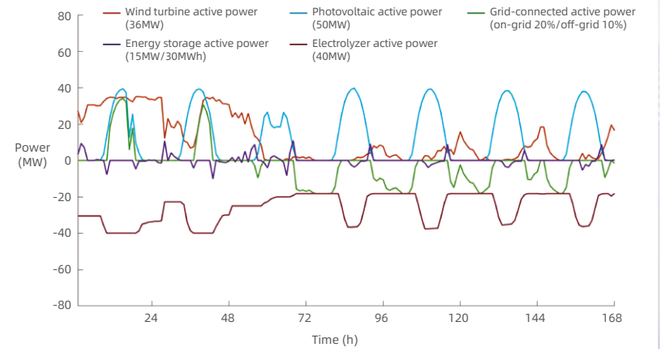


Test comparison between thyristor hydrogen production power supply scheme and that of the IGBT

Application in Gansu

- Hopewind hydrogen production power supply HHP-12900-546 matched with two sets of ALK electrolyzer was applied in a hydrogen production demonstration base in Gansu.
- Hopewind IGBT hydrogen power supply power density is high, small footprint, strong environmental adaptability, a one-off operation in low temperature conditions, to help the customer first hydrogen production project smoothly!

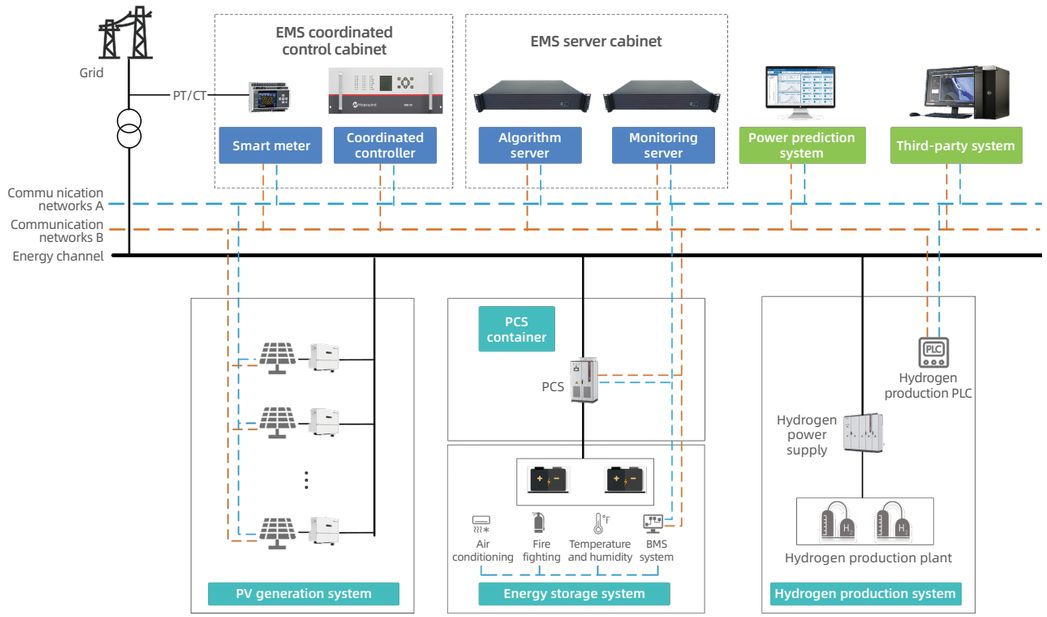




Active Power Dispatching Curve Of Grid-connected Power Plant

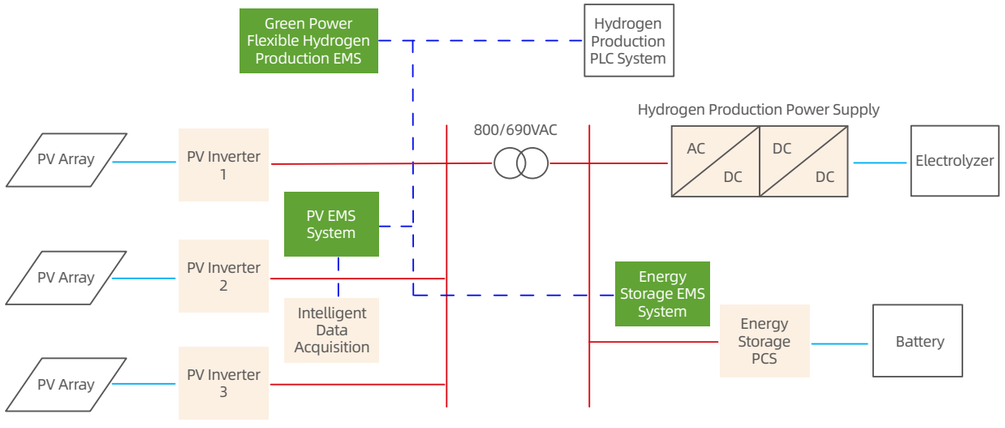
Application in Jiangsu

- In a demonstrative project in Jiangsu, China for hydrogen production with photovoltaic energy, Hopewind provided the entire hopeEMS, the management system for renewable energy to produce hydrogen, which supports multi-source energy dispatching and multi-device coordinated control. The system features control strategies customized based on the control characteristics and boundary constraints of the hydrogen production equipment. It enables efficient use of renewable energy, ensures the safety and reliability of the hydrogen production system, and maximizes hydrogen production efficiency. It also allows for visual monitoring of the hydrogen production system.



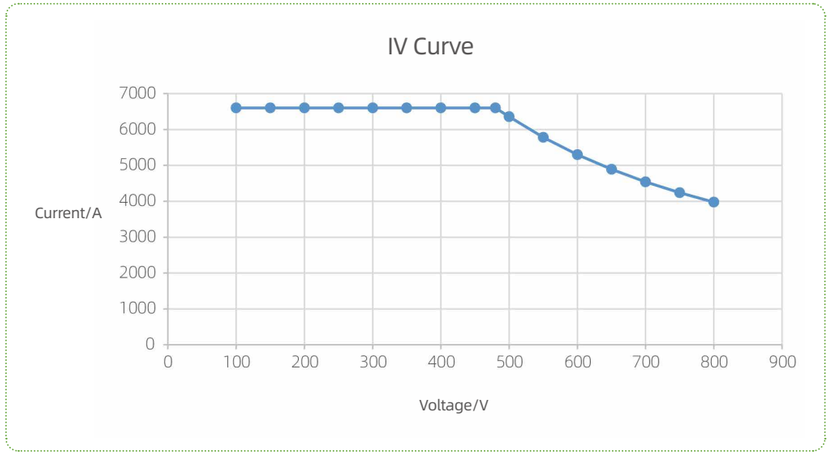
4 Application in Inner Mongolia

- Hopewind provided IGBT-based hydrogen production power supplies, grid-forming PV inverters, and green power flexible hydrogen production management system, which are compatible with PEM electrolyzers for off-grid PV hydrogen production.



5 Application in Hunan

- Hopewind provided four 4*3 MW liquid-coolilng IGBT hydrogen production power supplies for the test stations of the customer, meeting diverse testing requirements for different electrolyzers.



Application in Australia

- A Project in Australia, Hopewind provided water-cooled IGBT Power Supply For Hydrogen Production with the model as HHP-10450-546.
- Hopewind IGBT Power Supply For Hydrogen Production has obtained CE certification from authoritative organization with safety regulation and EMC certificates. Meanwhile, the power supply for hydrogen production for project is designed in strict accordance with Australian standards and IEC related standards, which meets the local requirements of Australia.
- In the project, basing on renewable energy and to electrolysis into hydrogen, its produced hydrogen will be used for blending with natural gas, which reduces carbon emissions from the industrial production process and people’s daily lives, helping the region to achieve net-zero emissions at an early date.

Application in Italy

- Hopewind provided integrated skid-mounted solutions, including transformers, IGBT hydrogen production power supply, and liquid-cooling systems.
- This project was the first PV-hydrogen energy storage demonstration project that received the "European Hydrogen Valleys" subsidy in Italy. Hopewind products have passed EU CE certification and safety compliance reviews, fully meeting the stringent requirements for green hydrogen equipment in European market.

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

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