SEEEx TECH

Integrated Electronic Control Platform Service Provider in Hydrogen Energy Application Scenarios



COMPANY PROFILE

Integrated electronic control platform service provider in hydrogen energy application scenarios. We have independently developed the industry's first programmable integrated electronic control system architecture, which can provide a composite frequency drive solution integrating hardware and software, and support the "Model Based Design"programmability and secondary development. Focusing on high-quality, flexible, adaptable, and scalable hydrogen energy control systems, we delve into zero carbon scenarios such as new energy interconnection, electrified transportation and travel, and green chemical processes, providing customers with "exclusive" comprehensive solutions for cost reduction, efficiency improvement, and energy conservation. Our products cover the full power level from 100 watts to megawatts. The core team members of the company come from top universities, in China and abroad, and Fortune 500 companies, with master's or doctoral degrees.

CORE COMPETENCE

SEEExTECH has the industry's only integrated software and hardware domain controller, successfully building a user programmable ecosystem that can achieve:

20%

Reduce Equipment Costs

Universal, modular, and integrated hardware platform

80%

Reduce Labour Costs

Save the vast majority of repetitive labor in the development, testing, and usage processes

50%

Reduce Product Iteration Cycle

The ecological platform has built-in rich development tools and call packages

100%

Architecture Self-Development

Independent software toolchain and open user programming and monitoring interface

HONOR

Gold Medal of the 49th International Exhibition of Inventions Geneva & the European Academy of Sciences

The 3rd Asian Innovation and Invention Exhibition - Hong Kong (AEII) Gold Medal (Jury Congratulations) & Inventions Geneva Award

2024 Forbes Asia 30 Under 30 List

2023 Forbes China 30 Under 30 List

Gold Award of National Postdoctoral Innovation and Entrepreneurship Competition, Overseas Competition

Most Promising Startups by Overseas Students, Ministry of Human Resources and Social Security, PRC

Gold Award of China International College Students' Innovation and Entrepreneurship Competition

Suzhou Gusu Innovation and Entrepreneurship Leading Enterprise

INTELLECTUAL PROPERTY



Electronic Control Service Solution

Integrated Electronic Control

By integrating electronic control devices into integrated hardware, the system development cycle has been significantly shortened and costs have been reduced.

Software Ecosystem

A complete integrated ecological framework,supports customized and secondary development.

Standardized Control Platform

The mass-producible electronic controller software and hardware platform provides customized software and hardware services for special scenarios, as well as system integration services.

Software

- Client ASW (C or MBD)
- SeeCube - BSW SeeCube - RTE (Base C)
- SeeLib Toolkit

Hardware



Interface Card

Support interface types: LS, HS, PWMIn, PWMOut, IO, AI, AO, HB, etc.

Integrated Development

IDE



Rapid Development

According to requirements, match modular boards and equip them with universal chassis for rapid hardware and software development.

Product Definition



SeeCube



FCU

SeeLab

.....

Customized Development Strategy

Relying on a fully self-developed development platform, mass produce universal machine-specific electronic control products, dynamically adjust development strategies according to market demand, and support customized needs.

Testing and Certification Reports



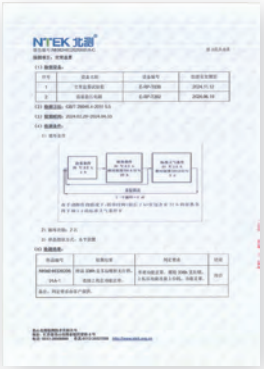
Temperature Shock



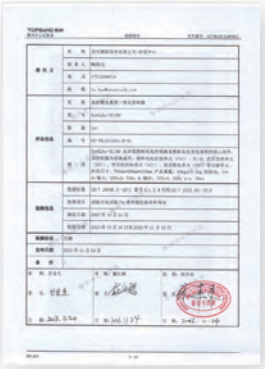
Electrical Performance



Efficiency Test



Salt Spray Test



Vibration Test

SEE-ECPaas

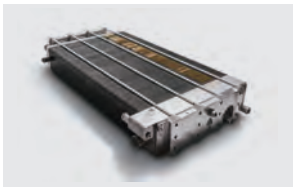
Electronic Control Development Services

Fuel Cell Electronic Control Development



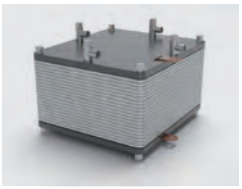
PEMFC

Anti-interference design
Intelligent fault diagnosis algorithms
Optimize control strategy
Open/sealed cathode stack types suitable



High Temp PEMFC

Heat resistant design
Extend the service life of the membrane
Intelligent fault diagnosis algorithm
Quickly implement running environment



SOFC

Stable current and voltage control system
Timely reporting and self-handling of anomalies
Optimize heat management and recovery

Hydrogen Electrolyzer Electronic Control Development



AWE

Efficient power electronic converter ,uses pulse width modulation technology to regulate input voltage and current, expanding the input power range.



PEMWE

Dynamic response and source efficiency optimization to ensure stable system operation.



AEMWE

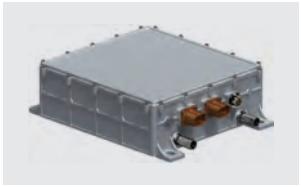
Advanced control algorithms and abnormal event management monitoring strategies enhance the system's self checking capability, ensuring safe and stable operation of the system.

Mechanical, Power and Electronic Control Development



Ultra High Speed Motor/Air Compressor Control

The power module designed with full silicon carbide provides higher efficiency, reliability, and faster dynamic response. Dynamically adjust the load frequency through a variable load frequency control strategy to optimize the operational efficiency and electromagnetic compatibility of the equipment.



High Efficiency DCDC Power Supply

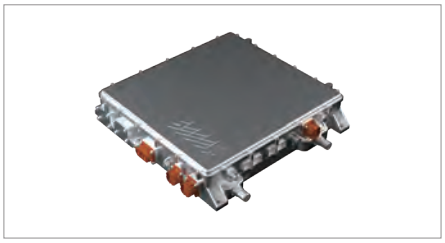
The compact design meets multi scenario applications, achieving optimal performance and efficiency through the use of silicon carbide based power switches, resonant topologies, and optimized control of converters.

SEECube-EC

Liquid Cooled Programmable Integrated Electronic Controller

Fully independently developed electronic controller, integrating core electronic controllers such as FCU, DCU, ACU, etc.
Using the latest generation of SiC high-frequency drive technology to meet the customized needs of multi scenario applications

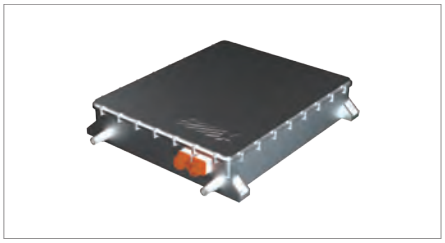
120kW Type —



180kW Type —



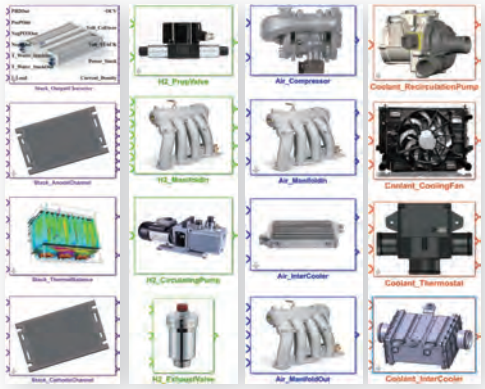
300kW Type —



User Programmable

Provide a complete development toolchain
Provide secondary development tools to support rapid model development:
Quick development assistance, quick inspection, file configuration tools

Fully self-developed human machine interface
Multi channel data acquisition, system debugging and other functions
Provide rich debugging interfaces for system optimization



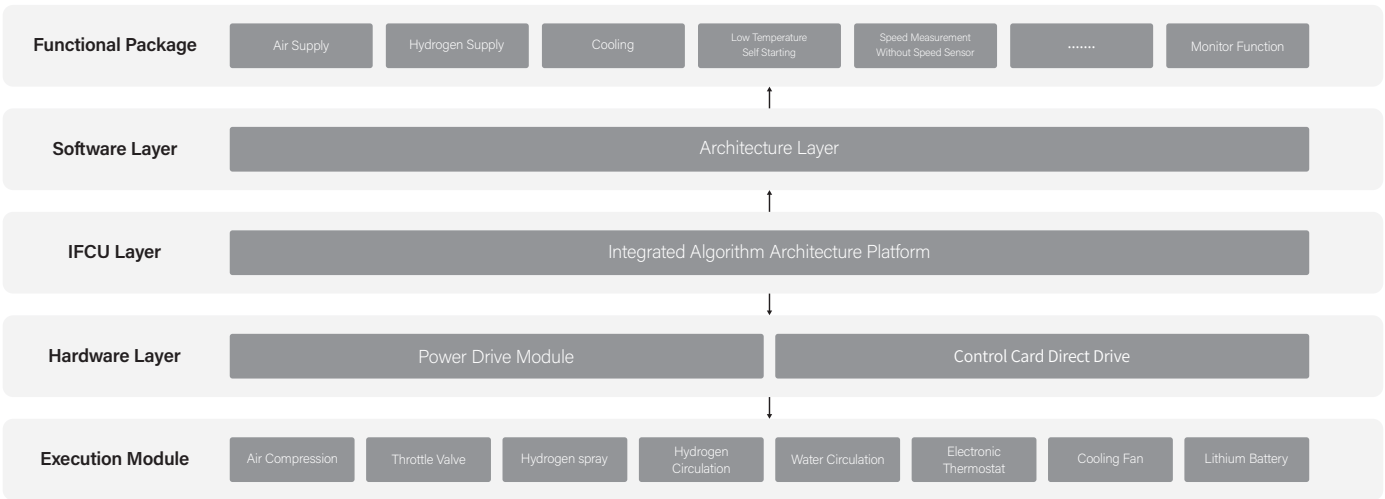


Integrated Multiple Drive and Control

Balancing flexibility and modularity to improve power density and reliability

Integration of Software and Hardware

Deep integration of software and hardware, more compact and efficient

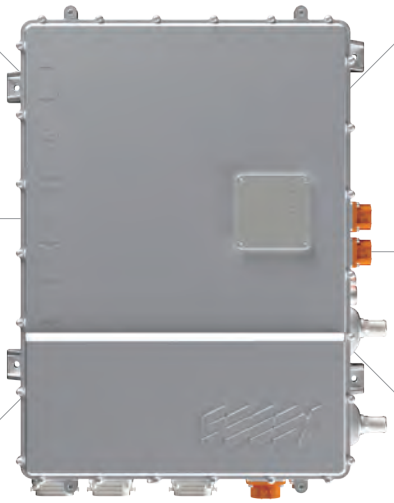


Slimmer and Lighter

Electronic control Integrated design
Ultimate space utilization
Supporting customized structural layout

Dual Security

Layers information perception
System level control layer
Full observation of power driven layer
Excellent anti-interference design



More User-Friendly

Parameter module matching multi brand accessories
Support C language and rapid prototyping development
Full process toolchain

Integrated Control

Core electronic control units Integrated
Minimum number of interfaces
Excellent integrated layout solution

More Cost-Effective

Reduce component and space usage by 40%
700A grade, fully rated input power coverage

High Applicability

hydrogen lithium hybrid architecture suitable
No additional development
Master-slave design, power expansion easily

Testing and Certification



Pass CISPR 25 CLASS 3

Advantages

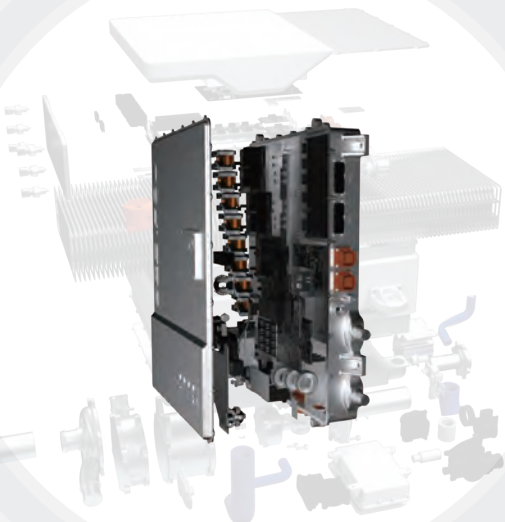
- 100% Self-Developed Hardware & Software
- OALD
- Embedded Development Tools
- High Power Density Ratio
- Autonomous and Flexible HMI Tools
- Rapid Response
- Fault Diagnosis, Fault Self-Recovery, Downtime Recovery

Scenarios















SEEPack-EC

Air-Cooled Programmable Integrated Electronic Controller

Hydrogen fuel cell controller is the core component of fuel cell power generation system, which is highly integrated with FCU, DC/DC, CVM, DCL, ACU, BMS and other functional units, and supports the voltage output of multiple platforms, with small volume, light weight, high efficiency, safety and reliability, and wide adaptability.

ADVANTAGES

- 100% self-developed
- Support secondary development
- Compatible with various connectors, rich interfaces
- Modular design, power modules expand easily
- Full life cycle maintenance and remote upgrades
- Optimal energy distribution and fast power response
- Supports fault protection and self-recovery

APPLICATIONS

- Emergency power
- Portable power
- Backup power
- Two-wheelers
- Light vehicles
- Small vessels
- UAVs



SEEHy-EC

Hydrogen Electrolyzer System Electronic Control

The hydrogen production controller developed by SEEExTECH can replace existing PLC equipment for hydrogen production. It has a simple MBD development environment. There is also a solution for using isolation barriers in the scene. The hydrogen controller is more compact, functional and advanced than the PLC.

ADVANTAGES

- Plug-and-play wiring
- Simple appearance, compact layout, quick installation
- User-friendly programming, fast debugging



SEE-H2X

SCENARIO SOLUTIONS



SEE-H2GRID

POWER GRIDS



Megawatt-scale energy storage systems



50kW, Chengde in Hebei, China



1MWp, Huizhou in Guangdong, China



860kWh, Huizhou in Guangdong, China



960kW, Huizhou



100kW, Shenzhen in Guangdong, China



100kW, Shenzhen

SEE-H2TRANS

TRANSPORT

Hydrogen-Powered UAV



Hydrogen-Powered Delivery Robot



Hydrogen-Powered Scooter



Hydrogen-Powered E-Bike



Hydrogen-Powered Tricycle

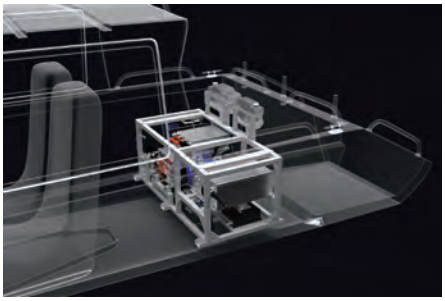


Hydrogen-Powered Sightseeing Car



hydrogen-Powered Vessel







Hydrogen-Powered Smart Security UAV



The SeePack-Sys-3000D is the first hydrogen-powered UAV with a built-in hydrogen power system. The lightweight stack and control design release load capacity, achieve a high power ratio and fast power response. SEEExTECH has developed a hydrogen power system for the vehicle using its own integrated hydrogen power architecture. Modelling and simulation help to find the best energy strategy and energy management for the vehicle's full working conditions. This meets the power demand of multiple power levels and ensures a long range, fast response and high safety. The achievements have led to several international/domestic invention patents and over ten high-level journal papers, which have helped the low-altitude economy.

Awards

The 3rd Asian Exhibition of Innovation and Invention
Hong Kong (AEII) Gold Medal (Jury Congratulations) & Inventions Geneva Award

Gold Medal of the 49th International Exhibition of Inventions
Geneva & the European Academy of Sciences

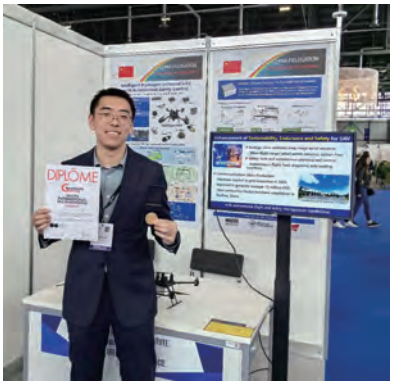












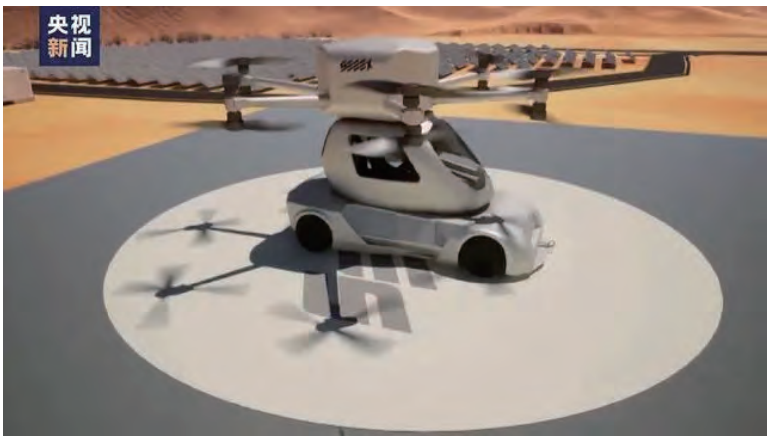


Press Releases

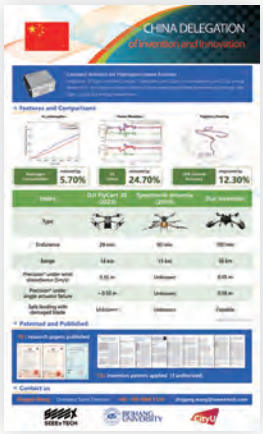
The project was featured on CCTV News at the Geneva International Invention Exhibition and then on many other CCTV channels. Xinhua News Agency, CCTV Finance and Economics, Finance and Economics Magazine and other central media also followed the project.



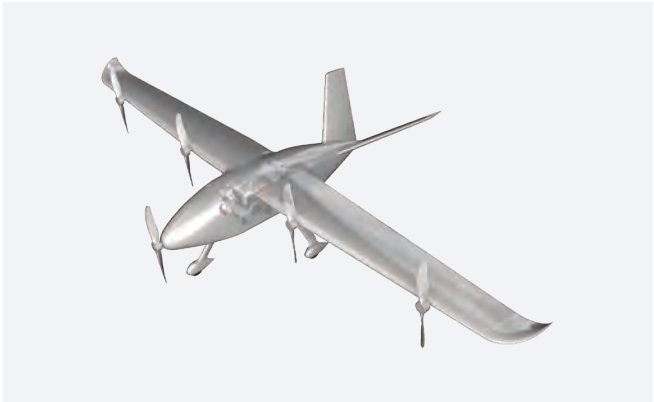








Technology Expansion





Hydrogen-Powered Fixed-Wing VTOL UAV

This hydrogen electric system is highly functional, modular and powerful. It can carry a large payload for long periods, support a wide range of payloads, has low energy consumption and a wide flight range.

Hydrogen-Powered Multi-Rotor Aircraft

Hydrogen-powered eVTOL can be used in many different ways, including in cities and for deliveries. It can save time and is an important solution to future air traffic problems.

Hydrogen-Powered E-Bike

SEEEX × TOPBAND 拓邦 × 国氢科技 SPIC HYDROGEN ENERGY



CHARACTERISTIC

Smarter The new torque sensor makes it easier and smarter to use the hydrogen powertrain.

Less effort High-efficiency hub motor, strong power, handles all kinds of road conditions.

Safer It has a strong, safe, solid-state hydrogen storage system that can withstand impact and heat.

More convenient Replacing a hydrogen cylinder takes just 30 seconds.

Longer lasting A small, powerful, long-lasting hydrogen power system.

More environmentally friendly No emissions or pollution from use, recycling or disposal.

Press Releases



SEEExTECH Hydrogen-Powered E-Bike



Government leaders visit the product line





Successfully Put into Operation in Lianyungang Qindao Heavenly Melody Scenic Spot



Jointly Building a Hydrogen Sharing Brand

SEE-ECoChain

ECOLOGICAL PRODUCTS



SEEPack | SEECube

Hydrogen Battery Pack



Hydrogen Mobile Power Supply

The best choice for outdoor travel and home backup power. Supports external hydrogen cylinder for worry-free range. Supports modular power expansion and can be equipped with a display.

- Modular design, flexible expansion
- Optimal energy distribution, quick power response
- Small, easy to carry, high energy, long battery life
- Can be used with different types of hydrogen cylinders



Standard Hydrogen Power Pack

It can be used in small unmanned aircraft, tricycles, sightseeing vehicles, light forklifts, cruise ships, etc. It can also be used in colleges and universities for fuel cell research.

- Plug-and-play for quick setup
- Modular design for quick power expansion
- Optimized energy distribution, fast power response
- Fault protection and diagnostic functions
- Data monitoring, warning, storage and traceability



Hydrogen Power Packs for UAVs

Designed for UAVs. It is more compact, supports modular power expansion and can be equipped with a display.

- Lightweight hydrogen fuel cell design, high energy density
- Supports a wide range of hydrogen cylinders and fixation
- Support for HMI
- Store fuel cell data
- The system is fault-proof

SEEPACK-SYS

Hydrogen-Powered Cycling



Hydrogen-Powered E-Bike

The hydrogen-assisted bicycle has a fuel cell electric control system that provides an amazing riding experience. The fuel cell controller, motor controller and intelligent central control operation platform are integrated and developed. They have a shared user applet, operation service platform and operation and maintenance app. These provide E-bike operation solutions.

- Long range, 100+ km assistance
- More stable power output, less hydrogen
- Low-pressure solid-state hydrogen storage,safer and easier to maintain
- Intelligent central control, comfortable driving experience
- Simple and beautiful styling



Hydrogen-Powered Scooter

The system controls the fuel cell, transfers power and manages the lithium battery. It makes the most of the space in the vehicle, ensures a stable power supply and allows for long distances.

- High power output and fast response
- Strong motor power
- Long range, support cycling more than 70km
- Complete system fault protection
- Reliable and upgradable firmware, support software upgrade

SEESOLUTION

Hydrogen Generator



Combined Hydrogen Electric Module

It can reduce the costs of backup power, improve reliability, save resources and reduce environmental pollution. It can also help to cut energy costs, reduce environmental risks and improve efficiency in places where there are strict environmental regulations, fire safety requirements and urban planning restrictions.



Hydrogen Generator

Hydrogen generators are for operators, microgrids for power, backup and critical infrastructure. It connects to 99.99% pure hydrogen from cylinders, electrolysers and reformers, and can cover power up to 10kW. The hydrogen fuel cell uses a chemical reaction between hydrogen and oxygen to create energy. The only emission is water vapour, which is environmentally friendly.



Multi-Units Parallel Hydrogen Power Generation System

The 100kW standard power unit can be expanded to a megawatt level for large-scale power generation.It can be flexibly and quickly expanded to megawatt level to meet the requirements of large-scale power generation.



Hydrogen Cogeneration Systems

Combining heat cogeneration and hydrogen energy utilisation in one product, it enables the simultaneous production and utilisation of electricity and heat, and improves the efficiency of energy utilisation.



Integrated Hydrogen Energy Production, Storage and Generation System

A multi-module parallel power generation system integrating hydrogen production, storage and power generation for optimal energy utilization, which can be applied to large-scale hydrogen power generation scenarios.

SEE-Edu

Institutional Education

Fuel Cell Basic Principle Teaching Demonstration System



Air-Cooled Hydrogen Fuel Cell System Test Bench



Fuel Cell Power System Teaching Practice Platform



Fuel Cell System Development Kit







Water-Cooled Hydrogen Fuel Cell System Test Bed



FCU Hardware-In-Loop (HIL) Semi-Physical Simulation Testbed



Investor Relations

九合创投 UNITY VENTURES | K2VC 险峰长青 | TOPBAND 拓邦

东方国资 Orient State-owned Capital | 江苏金桥基金 | Bridge Capital 架桥资本

Partner Institutions

哈爾濱工業大學 | 北京航空航天大學 BEIHANG UNIVERSITY | 北京理工大学 BEIJING INSTITUTE OF TECHNOLOGY | 復旦大學

上海交通大学 Shanghai Jiao Tong University | The University Of Sheffield. | KING'S College LONDON

Cooperative Partners

EKPO FUEL CELL TECHNOLOGIES | HYDROS POWER | 安洁科技 ANJIE TECHNOLOGY | AE&M 安靠创明

AUYAN 奥扬集团 | 澳盛科技 AO SHENG HI-TECH | BALLARD | CAINIAO 菜鸟

REFIRE | 国富氢能 GUOFUHEE | 国鸿氢能 SINOSYNERGY | 国氢科技

航天氢能（上海）科技有限公司 | HRC | 亨通集团 HTGD | HQHP

骥翀氢能 | QING POWER 嘉清科技 | 捷氢科技 SHPT | 上海氢晨 H-RISE


HYFUN氢枫

氢璞创能
NOWOGEN

氢途科技
HYDROT

氢沄
HYNAMO

清极能源

Horizon
清能股份

SUNSHINE
清耀新能源

上海电气
SHANGHAI ELECTRIC

文景能源
WENJING ENERGY

ECA

TBEA
特变电工

THB

FTXT未势能源

SkySYS 星逻智能

VISION雄韬 氢雄
HydraV

亿华通
SinoHytec

EVE亿纬氢能

逸动科技
EPROPULSION

ZHEJIANG ENERGY
浙江能源

电力规划设计总院
China Electric Power Planning & Engineering Institute

中国华电
CHD

中国节能
CECEP

sinoma
中国中材

CRCC
中国铁建

NOTES

TRACING CURRENTS

HARNESSING FUTURES

Official Website

WeChat

Sustainable Electrified Energy Expert

SEEExTECH all rights reserved

Images and content in this article are quoted from publicly available reports in the China region and are authorised by the owners.