CPU H2

- CPU Hydrogen Power Technology (Suzhou) Co., Ltd.

- www.cpuh2.com

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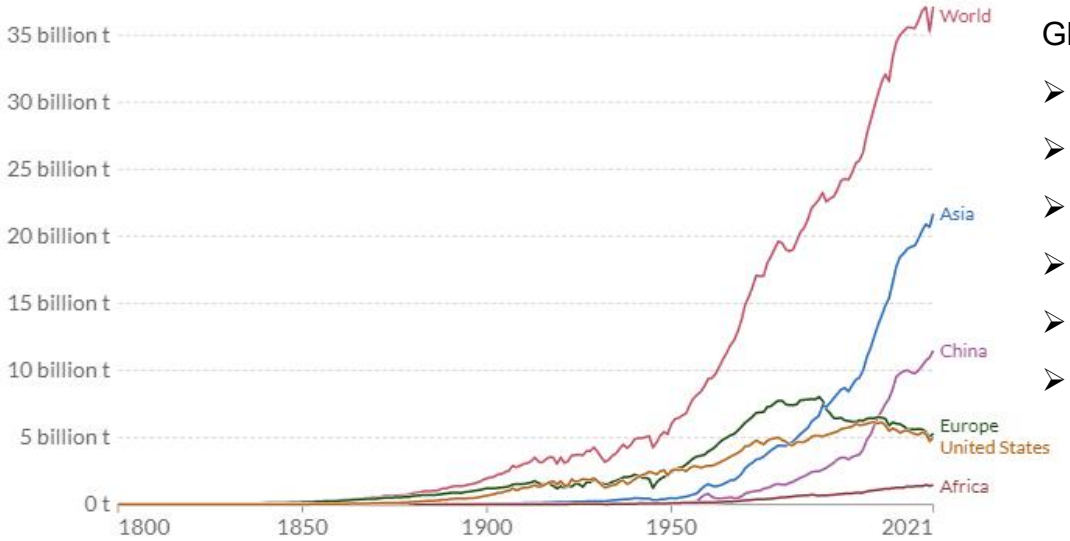
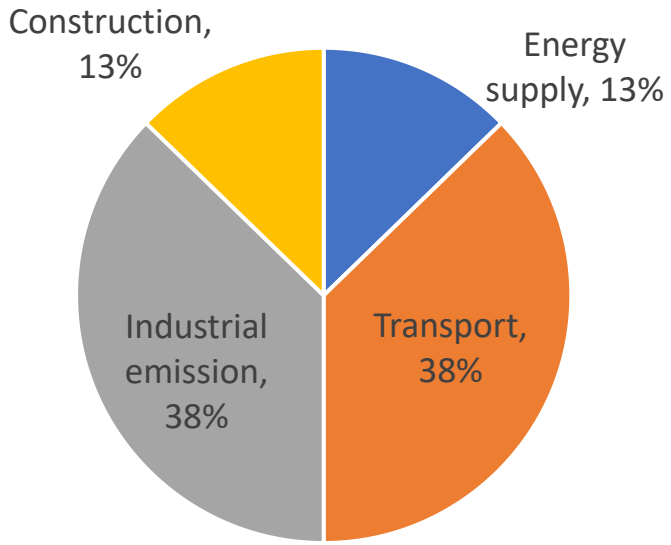
Background

- Climate change is one of the biggest challenges in future decades
- The emission of carbon dioxide (CO_2) has led to climate change and global temperature rise
- According to the Paris Agreement, reduce greenhouse gas emissions by 2050 and limit temperature rise to below two degrees
- China will achieve carbon peak by 2030 and carbon neutrality by 2060



Global CO_2 Emission in 2022

- World: 37.12 bt
- Asia: 21.69 bt
- China: 11.47 bt
- EU: 5.31 bt
- US: 5.01 bt
- AF: 1.45 bt



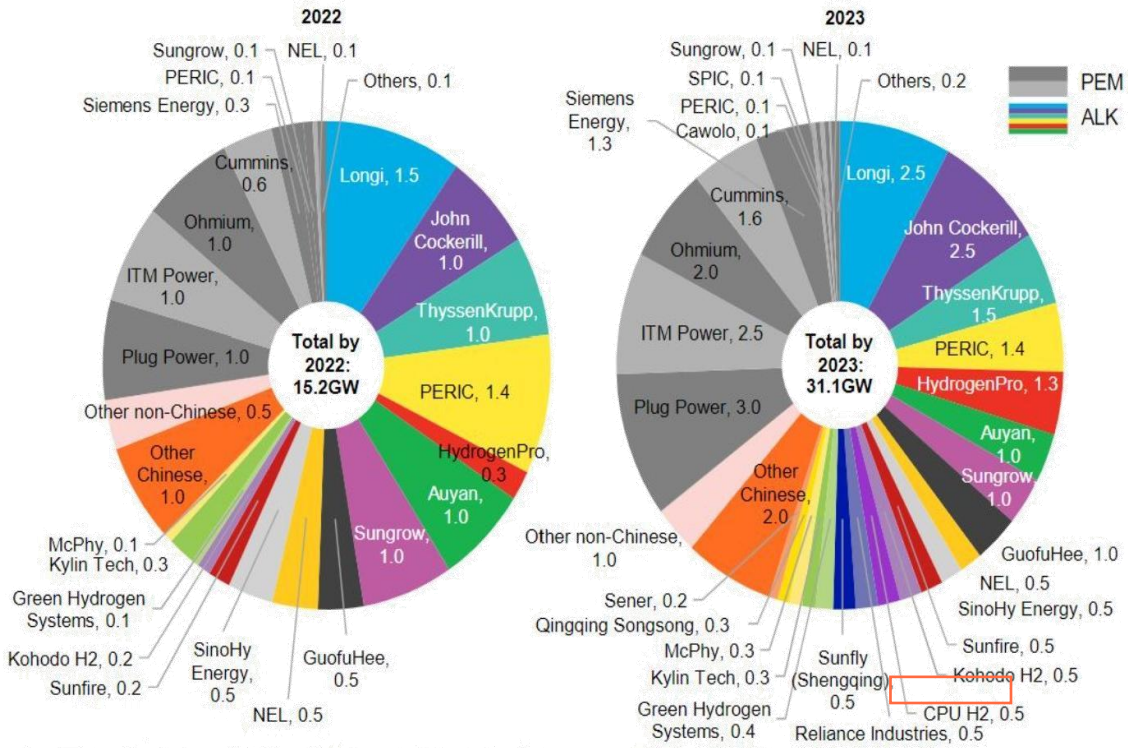
CO_2-Emission

By 2050, hydrogen energy will help reduce carbon emissions worldwide by 80 bt. Most of them are industrial emissions and transportation emissions.

Source: Our World in Data based on the Global Carbon Project (2022)

Forecast of global electrolyzer production capacity in 2022-2023

Annual electrolyzer manufacturing capacity



Source: Company filings, industry sources, BloombergNEF. Note: The values refer to year-end capacities.

- According to BloombergNEF, in 2022, the global electrolyzer production will exceed 1 GW.
- In 2023, the Chinese electrolyzer production will be 1.4-2.1 GW, accounting for more than 60% of the global production that year.
- In 2024, the global electrolyzer production will be 2.4-3.8 GW, and the alkaline hydrogen production technology route will continue to dominate with performance indicators such as economy, large-scale, high conversion efficiency and strong reliability. And the CPU production capacities are expected to be 0.5 GW.

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Applications

Demonstration application: energy storage field

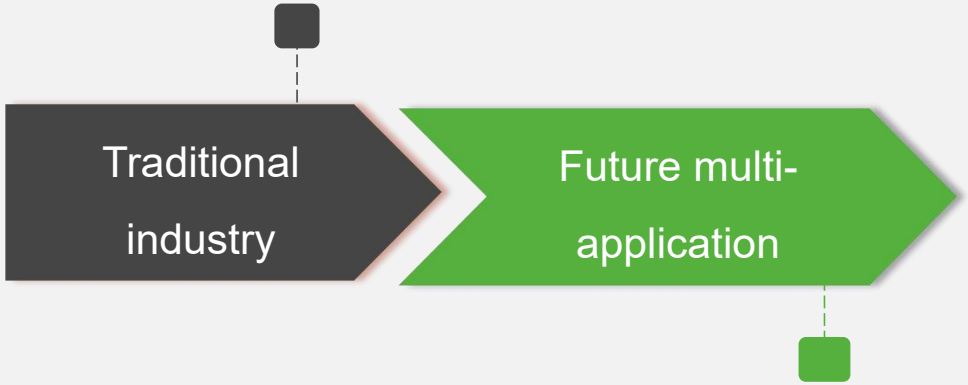
Alternative application: industrial application

Multiple application: distributed cogeneration

Demonstration application: transportation field

Development trend

Low gas consumption,
high calorific value



The large-scale use of hydrogen mainly depends on whether the cost is advantageous

The challenges to lower the cost

Present price

For vehicle:

1 kg hydrogen（ ? $） ≈ 6-7 L gasoline

☑ **Economics needs achieving:**

Unit price of electrolyzer **≤ 274 USD/KW**

Electricity cost **≤ 0.027 USD/KWh**

Hydrogenation station cost **≤ 1.37 USD/kg**

Terminal hydrogen cost **≤ 3.43 USD/kg**

The price of fuel-cell vehicle urban agglomeration is low, with an average of 7.54 USD/kg. The non-fuel-cell vehicle city group price is higher, with annually maintained at ~10 USD/kg.

Green hydrogen popularization

Low cost + **Low carbon** + **Clean**

1. Demonstration of hydrogen production from renewable energy sources will be carried out in areas full of wind, solar and hydropower resources.

Production Method	Carbon emission intensity ($kgCO_2/kgH_2$)
From coal	22~35
From natural gas	10~16
From petroleum	12
Coal+CCUS	3~5
Natural gas+CCUS	1.5~2.4
Renewable energy source	**< 0.5**
From grid power	33~43

2. In concentrated areas of coking, chlor-alkaline, propane dehydrogenation and other industries, priority is given to the use of industrial by-product hydrogen.

Production method	Produced hydrogen unit cost (China)	
	USD/m³	USD/kg
Chlor-alkaline	0.16~0.25	1.81~2.71
Propane dehydrogen-ation	0.17~0.25	1.88~2.71
Electrolysis	0.13~0.29	1.41~3.23
Coke oven gas	0.11~0.18	1.25~2

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Well-known
Manufacturer of electrolytic hydrogen production equipment

Use hydrogen energy to cool the earth

About us

Founded in 2021, CPU Hydrogen is a well-known manufacturer of alkaline water electrolysis hydrogen production equipment in the industry. The factory is headquartered in Xiangcheng District, Suzhou, the hinterland of the Yangtze River Delta City cluster. It integrates R&D, production and sales, and its marketing network is distributed in major domestic and overseas hydrogen production markets. The company aims to provide hydrogen production system with advantages of space-saving, low cost, low energy consumption, high current density, full automation and dynamic working to promote the development of hydrogen energy industry.

Key Milestones

2021

- The 1st miniature hydrogen electrolyzer
- Developed the first set of electrolyzer resin frame
- The 50 Nm^3/h hydrogen production system successfully rolled off

2022

- The Large-scale electrolyzer passed through the pilot test
- The hydrogen production system of 1000 Nm^3/h rolled off

2023

- The 200 Nm^3/h container hydrogen production system rolled off and released at the Shanghai SNEC exhibition

2022

- The 1000 Nm^3/h hydrogen production system has completed continuous operation with DC energy consumption of 4.4 KWh/Nm^3 H_2 and entire system energy consumption of 4.8 KWh/Nm^3

2022

- The 50 Nm^3/h skid mounted hydrogen production system rolled off

Business distribution

Inner Mongolia CPU Hydrogen Power Technology Co., Ltd.

CPU Hydrogen Power Technology Co., Ltd.

Suzhou: research and development center

Four production sites

Suzhou, Xingan League

Manufacturing

■ Standardized production

Have automatic production equipment suitable for advanced technology production requirements, and improve product production efficiency through standardized production.

■ ERP information management system

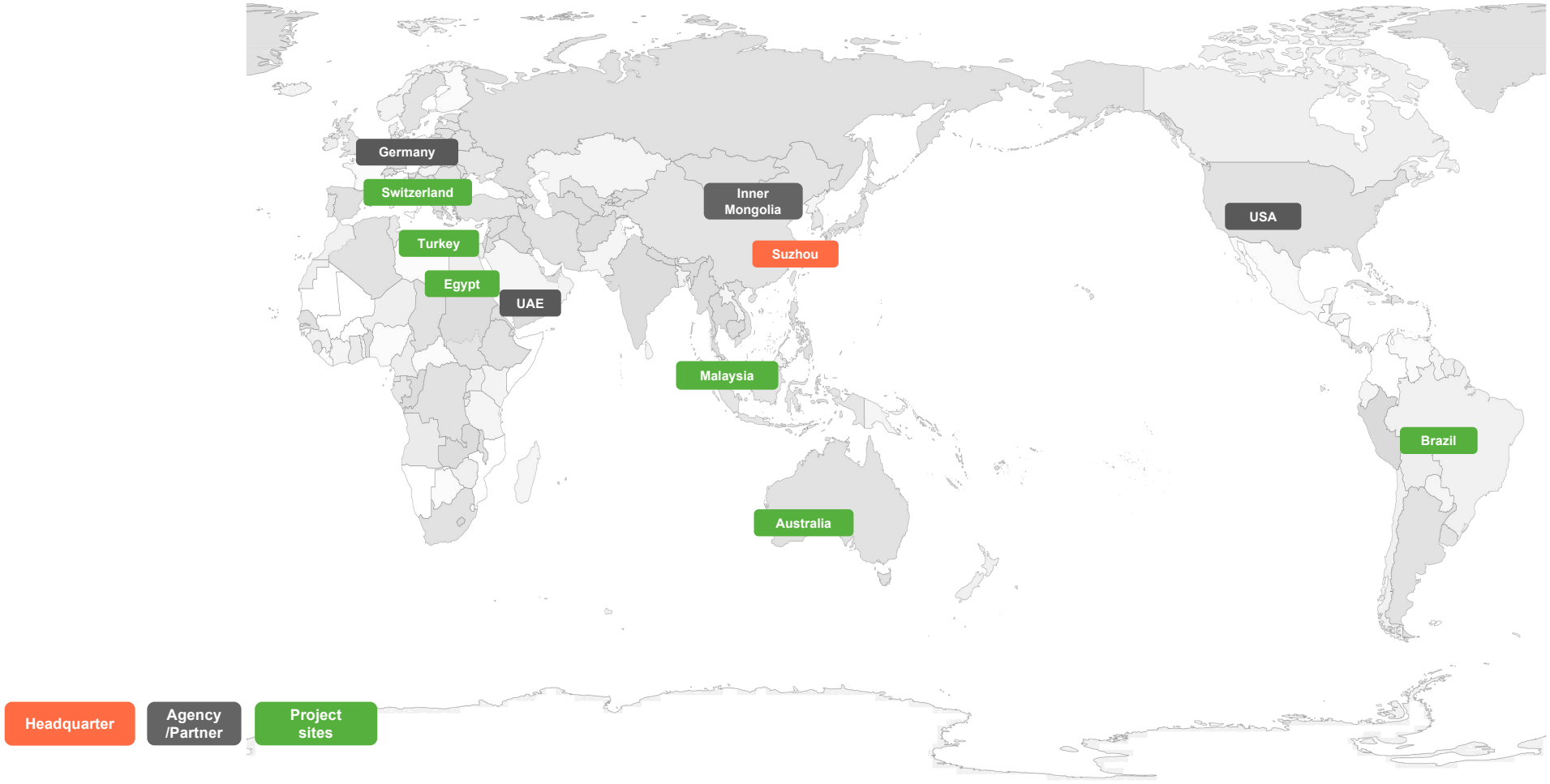
CPUH2 ERP platform can achieve real-time interaction, implementation plan, real-time execution, so that the production is more processized with standardized management to meet the QCD requirements.

■ Whole-process quality management system

Based on ISO 9001:2015, ISO 45001:2018 and ISO 14001:2015, a control system covering the entire production process is established to ensure that every production stage and element of the designed product is included in the quality management.

Development blueprint

Based on China, CPU Hydrogen Energy continues to deepen the Asian market, while vigorously expanding the Middle East, North Africa, Europe, Australia market, and improve the global layout.



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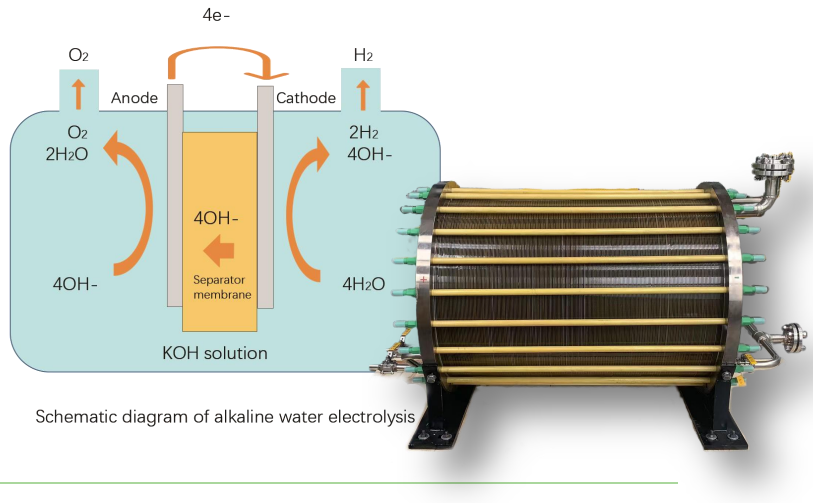
Technical route

Considering the availability of resources, maturity, etc., in terms of technology, CPU Hydrogen is currently propelling the ALK route to achieve a safe, reliable and practical zero-carbon journey.



Schematic diagram of alkaline water electrolysis

1

- **New electrolyzer structure**
  - Avoid contact resistance
  - Optimize the distribution structure of lye channels
  - Optimize the internal flow field to reduce the flow resistance of the fluid
  - Reduce DC energy consumption

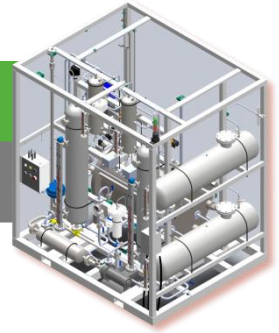
2

- **Separator membrane**
  - Independent research and development on membrane technology
- **Electrode structure and catalyst**
  - Improve electrolytic efficiency and reduce cost

Product series

P Serie

- 50Nm³/h
- Skid framework



The hydrogen production system, which comprises electrolyzer, post-processing frame and hydrogen drying device, has the characteristics of high integration, small footprint, low moisture content, high automation, convenient transportation and installation.

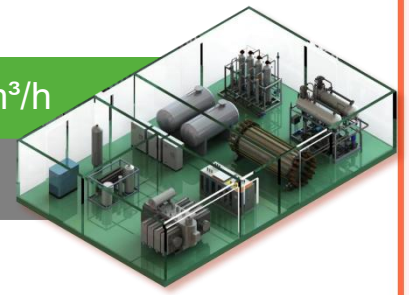
C Serie

- 50-200 Nm³/h
- 40 ft container

MW class complete set of electrolytic hydrogen production system, compact structure, centralized arrangement, only covers 30 m³. Only water and power are needed on site, and installation is simple.

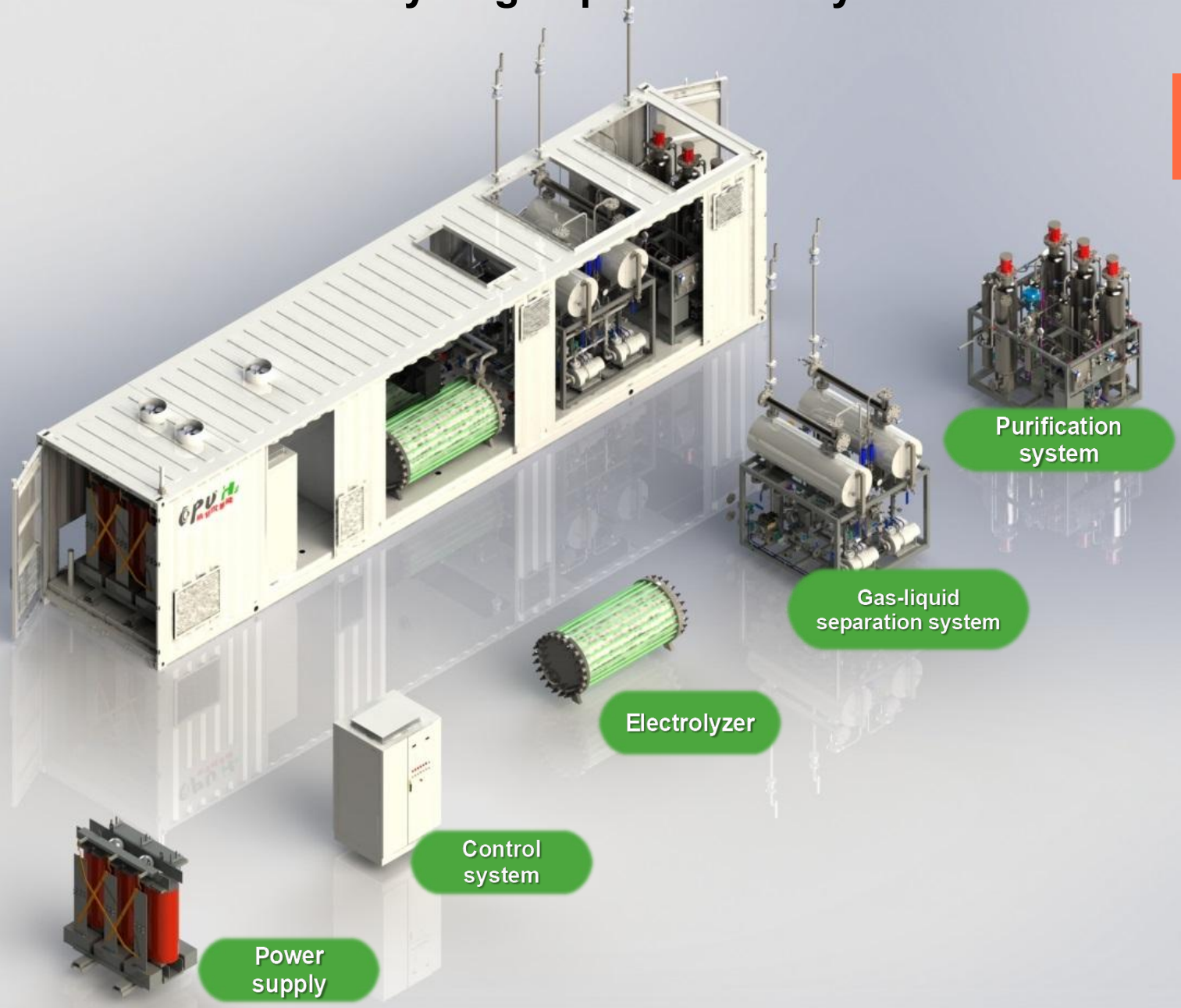
D Serie

- 50-1000Nm³/h
- Plant



The rated load of the electrolyzer varies between 20% and 110%, and the DC energy consumption is 4.4 KW·h/Nm³ when the current density is 3500 A/m², which is at industry-leading level.

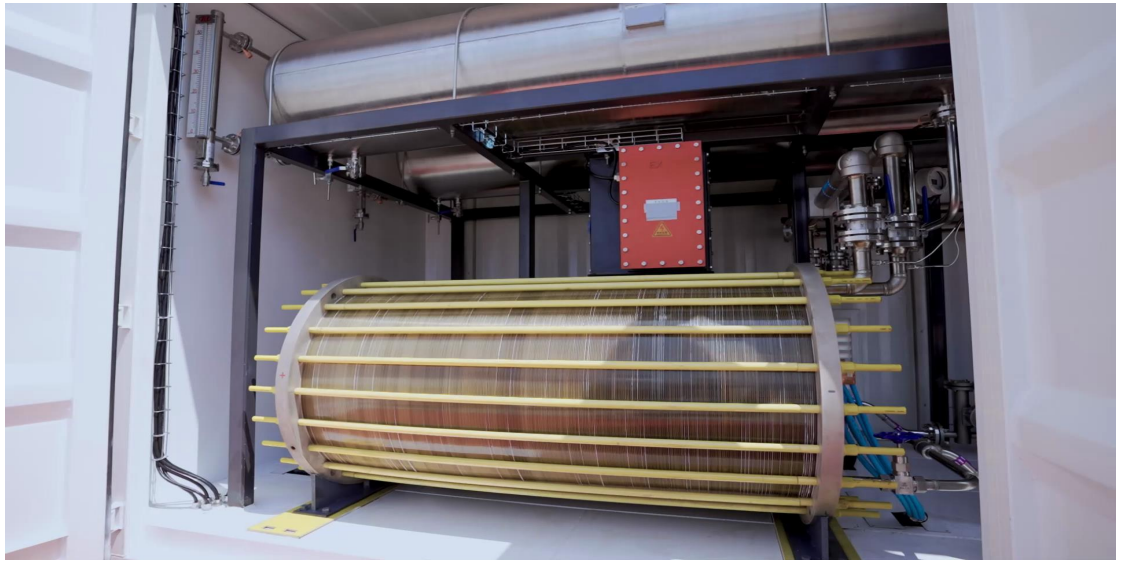
CPU 200 Nm³/h container hydrogen production system

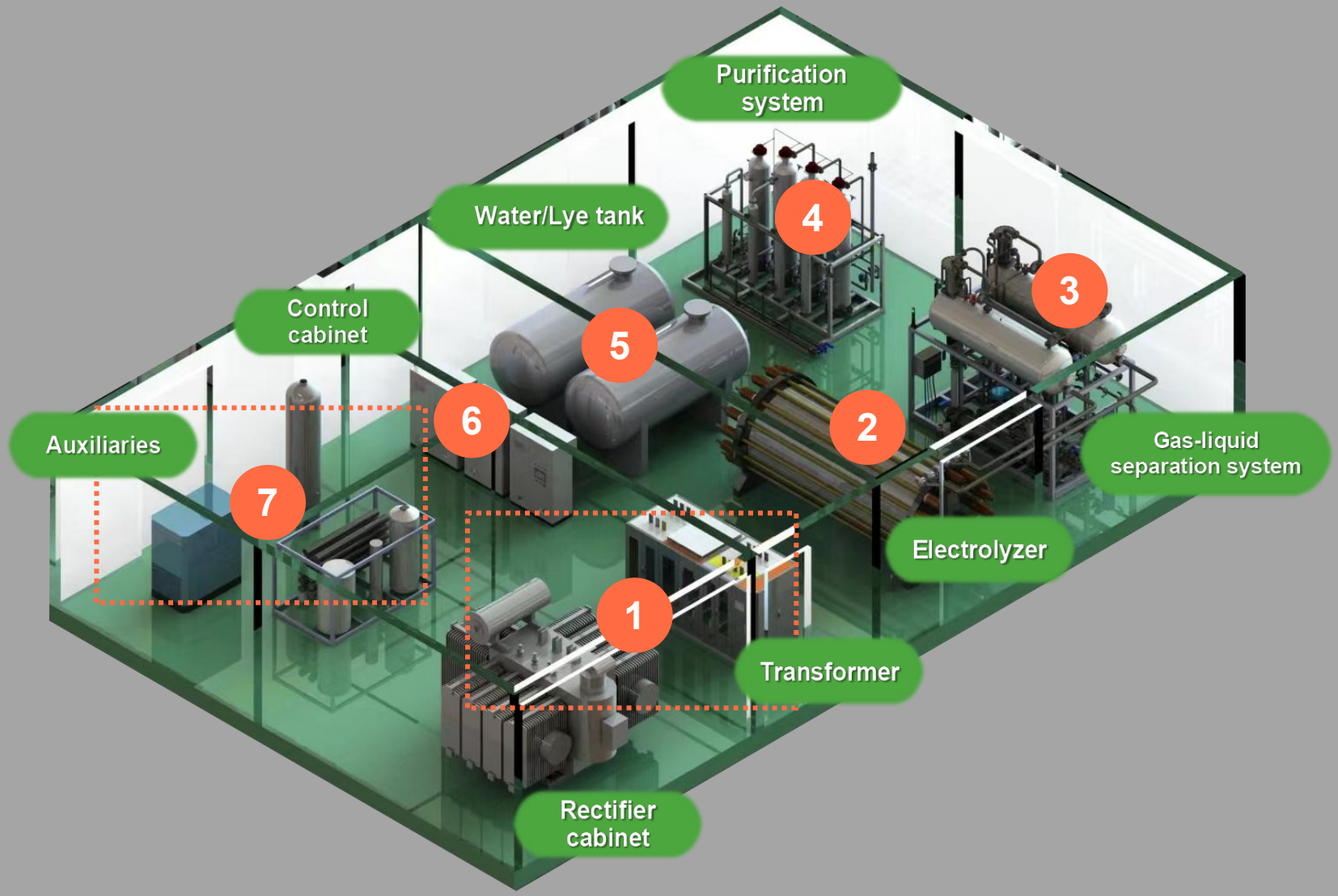


C Serie

1. 40 ft standard container
2. Resin framework
3. One gas-liquid seperator for two electrolyzers
4. The complete set of equipment outdoor, lower the cost of construction
5. Modular design, easy to transport and install
6. Produce hydrogen and meanwhile refuel hydrogen vehicles and vessels on site, lower the cost of transportation

CPU container-type 200 Nm³/h electrolytic hydrogen production system





D Serie

1. Convert medium voltage AC into DC for the cell stacks
2. Split water molecules into hydrogen and oxygen
3. Separate hydrogen/oxygen from lye with 99.9% purity
4. If required, hydrogen can be further purified to 99.999%
5. Refill the water and lye
6. Centralized plant logic and safety control system
7. Support items for the hydrogen prodcution system

Third-party testing and certification

DEKRA

ATTESTATION OF CONFORMITY

Issued to: CPU Hydrogen Power Technology (Suzhou) Co., Ltd
Floor 1, Building 1, No.68 Chunqiu Road, Huangdai Town, Xiangcheng District,
215143 Suzhou City Jiangsu, China

For the product: Hydrogen generators using water electrolysis

Trade name: CPU

Type/Model: ALK-1000/1.6

Ratings: Hydrogen Production: 1000Nm³/h

Manufactured by: CPU Hydrogen Power Technology (Suzhou) Co., Ltd
Floor 1, Building 1, No.68 Chunqiu Road, Huangdai Town, Xiangcheng district,
Suzhou, Jiangsu, China

Requirements: DEKRA K196:2023

This Attestation is granted on account of an examination by DEKRA, the results of which are laid down in a confidential file no. 6149609B.50.

The examination has been carried out on one single specimen or several specimens of the product, submitted by the manufacturer. The Attestation does not include an assessment of the manufacturer's production. Conformity of his production with the specimen tested by DEKRA is not the responsibility of DEKRA.

Arnhem, 3 April 2023 Number: 6149609.01AOC

DEKRA Testing and Certification (Shanghai) Ltd.

C. Lin
Certification Manager

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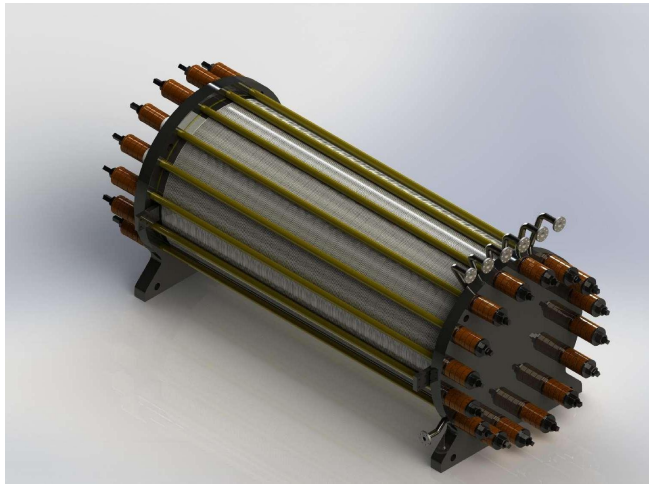

1000 Nm³/h alkaline water electrolysis hydrogen production system

▲ CPUH2-1000/1.6-D **1000Nm³/h Already in operation**

Performance

- Rated power can range between 20% and 110%
- After gas-liquid separation, the **purity** of hydrogen is up to 99.95%
- Under 3500A/㎡ current density, **DC energy consumption ≤ 4.4 KW·h/Nm³**

Services we provide

1. **Tailor on-site hydrogen production solutions for customers**
2. **Provide complete equipment production, installation, equipment test and others**
3. **A full set of software, equipment operation training services**
4. **Provide spare parts related to equipment maintenance**

Thank you for your attention

- CPU Hydrogen Power Technology (Suzhou) CO., Ltd.
- Contact us

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