John Cockerill
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Cockerill Jingli Hydrogen

- Leading Supplier with Alkaline Water Electrolysis Hydrogen Production Technology
- Professional & Customized Solution Provider

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CATALOGUE

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01 COMPANY PROFILE

John Cockerill
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John Cockerill group, headquartered in Seraing, Liege, Belgium, is an multinational corporation with more than 200 years of industrial equipment production and operation experience. Its business includes energy, defense, environmental protection, industry and service, and Hydrogen six major sectors, with about 6,000 experienced and highly professional engineers worldwide, to help CJH to provide more professional and faster service to customers around the world.

JCH2 targets a rapid geographical expansion

Headquarter of Hydrogen Business of John Cockerill： Belgium

R&D center： Belgium, China

Industry Layout： China, Belgium, France, India, Morocco, United States, United Arab Emirates

Gigafactories overview

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	GF1 | China	GF2 | Europe	GF3 | USA	GF4 | India
Location	Suzhou (China)	Aspach (France) + Seraing (Belgium)	Houston, Texas (USA)	Kakinada (India)
Ownership	100% (since 2022)	100%	100%	60% (Joint venture with greenko)
Nominal capacity	1GW/year	1GW/year (to be achieved by 2026)	1GW/year	1GW/year
Factory status	Operational since 2019	Operational since 2024	In construction start in 2025	In construction start in 2025
Scope of activities	Cell manufacturing + Stack assembly	Cell manufacturing + Stack assembly	Stack assembly only (initially)	Stack assembly only (initially)

Local cell manufacturing will be added as soon as market demand is confirmed

John Cockerill Hydrogen has roots dating back to 1818 and 30+ years of experience in the manufacture of electrolyzers

1817
Founding of the company John Cockerill

1992
Founding of Suzhou Jingli Hydrogen, a company dedicated to the manufacture and sale of hydrogen electrolyzers

2018
Creation of Cockerill Jingli Hydrogen (JV held at 56% by John Cockerill)

2021
John Cockerill Hydrogen is incorporated

2022
- Cockerill Jingli becomes a 100% subsidiary of John Cockerill Hydrogen
- Joint venture with greenko for the Indian market

2023
- Creation of rely, a joint venture between Technip Energies and John Cockerill
- Acquisition of brownfield site in Houston to launch US gigafactory

2024
- New external shareholders (SLB, SFPIM, WE, …)
- First European stack produced

[20-30%] global market share during this period

Cockerill Jingli Hydrogen

- 30+ years experience in developing and manufacturing hydrogen production equipment.
- With around 60 patents, and CE and ASME Certification on products, CJH is awarded many honored titles such as the national high-tech enterprise.

Development situation (Suzhou)

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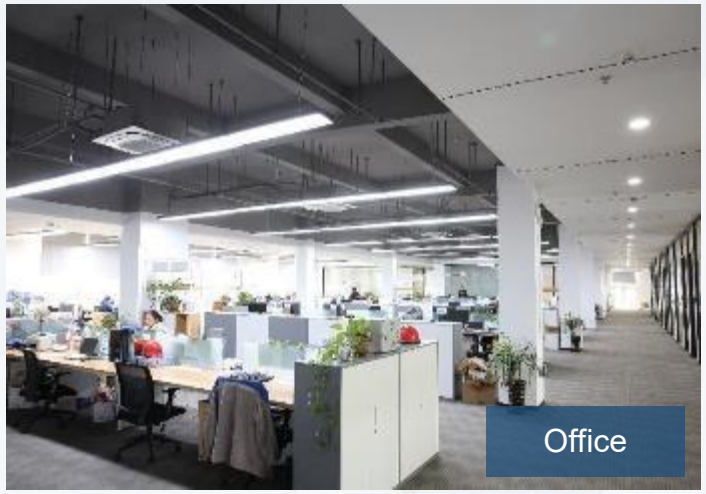
Overview


Showroom

reception


Office


Factory


Meeting Room

◆ The annual production capacity of the Suzhou factory is 500MW, with a total area of approximately 18000㎡.

Cell manufacturing process

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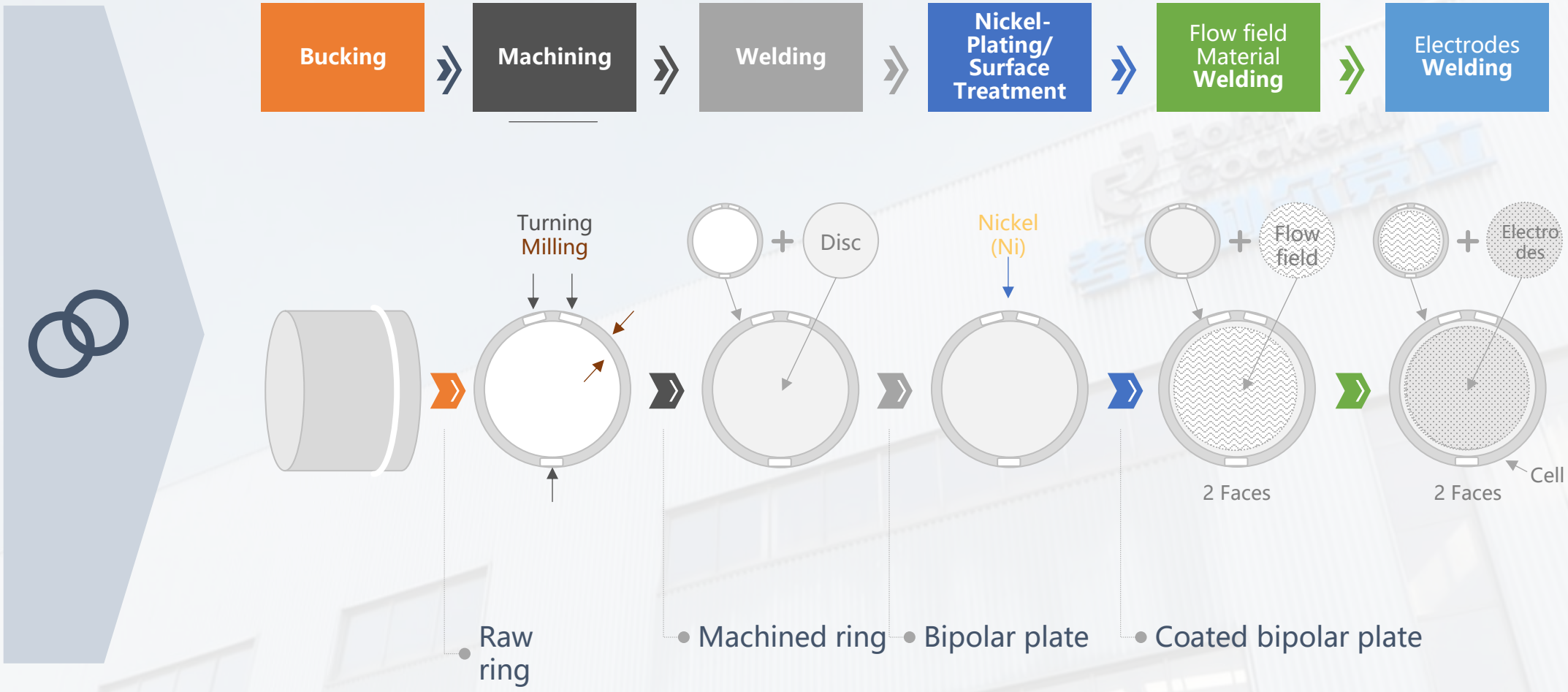

Stack assembly process

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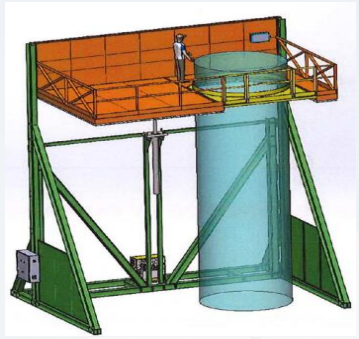
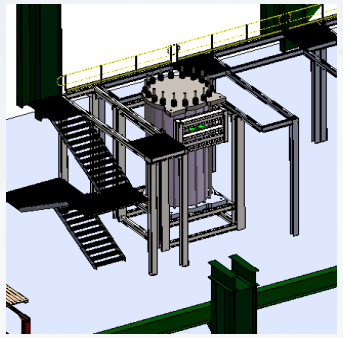
Assembly → **Tightening** → **Tilting** → **Tests & packaging**



The [20-400] cells that compose the stack are stacked vertically, one piece at a time. In this crucial step, ensuring perfect alignment is key



The assembled stack is then tightened through a process of heating the stack, tightening it, letting the stack cool down, and then starting again.

Once ready, the finished stack is then tilted using powerful cranes

Before packaging & shipping, our teams proceed to a thorough testing of the stack :

- Hydrotest (using pressurized water at 1,5 design pressure)
- Leakage (using helium)
- CC test (no short circuit)
- Passivation (chemical treatment for transport)

Lead time [13] days

[2] [5] [1] [5]

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02 WORLDWIDE SERVICE

Worldwide Service

20 +
Service industries

1300+
Eletrolyzers

100,000+ tons
Annual Hydrogen Output

30+
Countries & Regions

Industry Application

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- Petrochemicals/ Ammonia/ Methanol
- Steel
- Polycrystalline Silicon
- Semiconductor
- Scientific Research
- Nonferrous Metallurgy
- Co-generation
- Mobilization
- Glass
- Biology
- Power Plant
- Food Additives
- Cement
- Beauty
- Medicine
- Space Flight and Aviation

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03 PRODUCT

Hydrogen Production System

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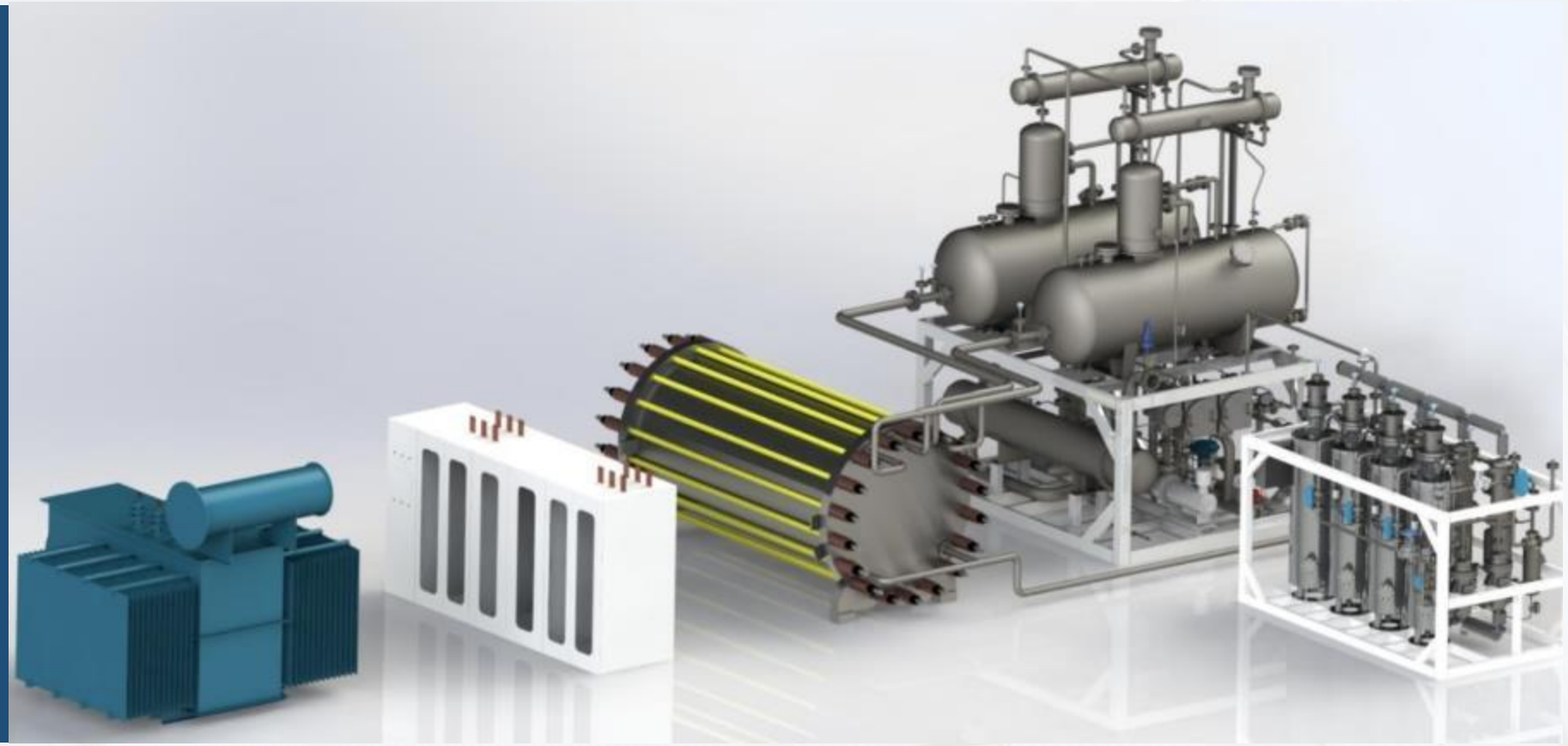
- Transformer
- Rectifier Cabinet & Control Cabinet
- Electrolyzer
- Gas-Liquid Separation Frame
- Purification Frame
- Auxiliary System



Product Introduction

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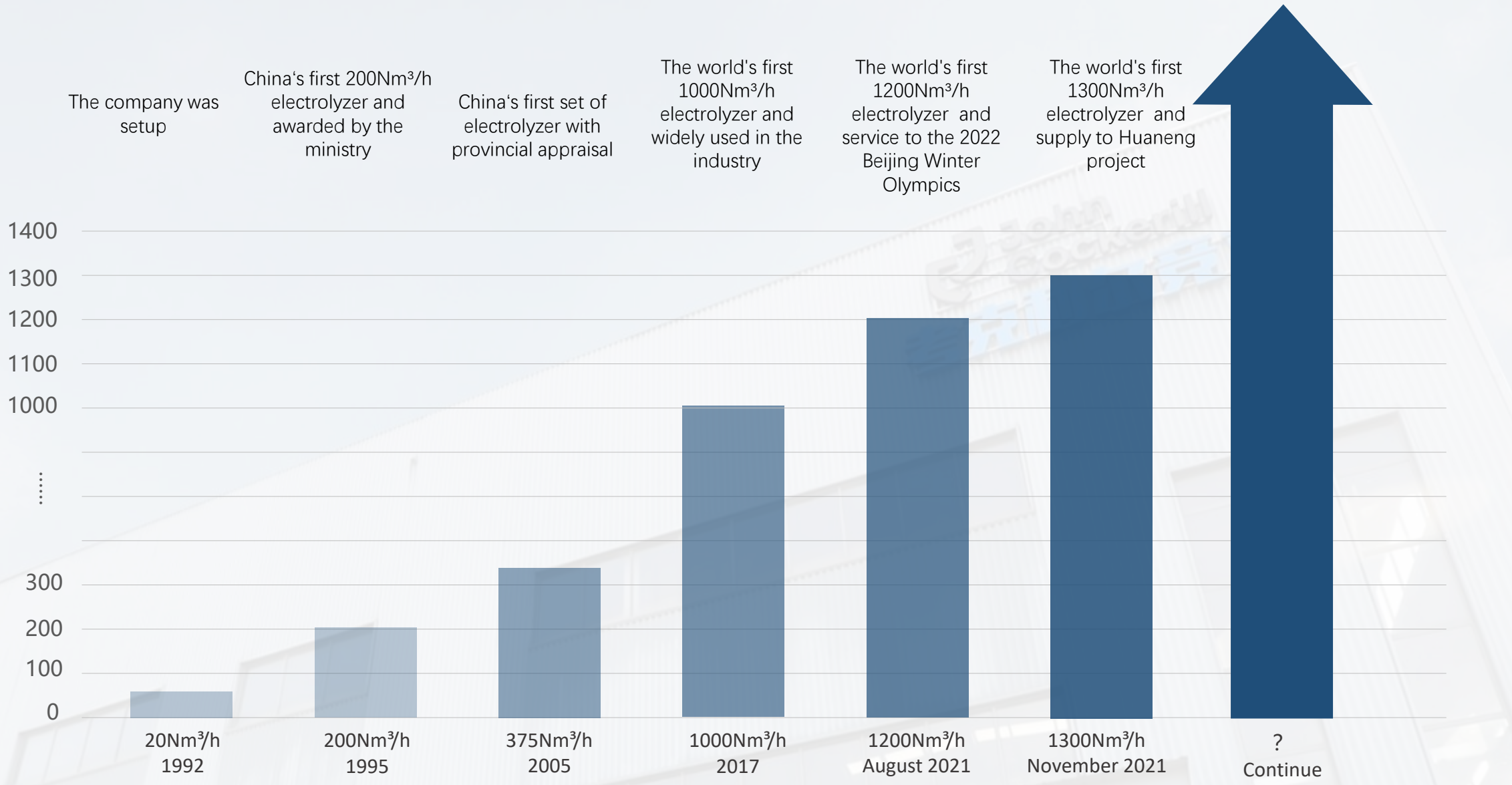
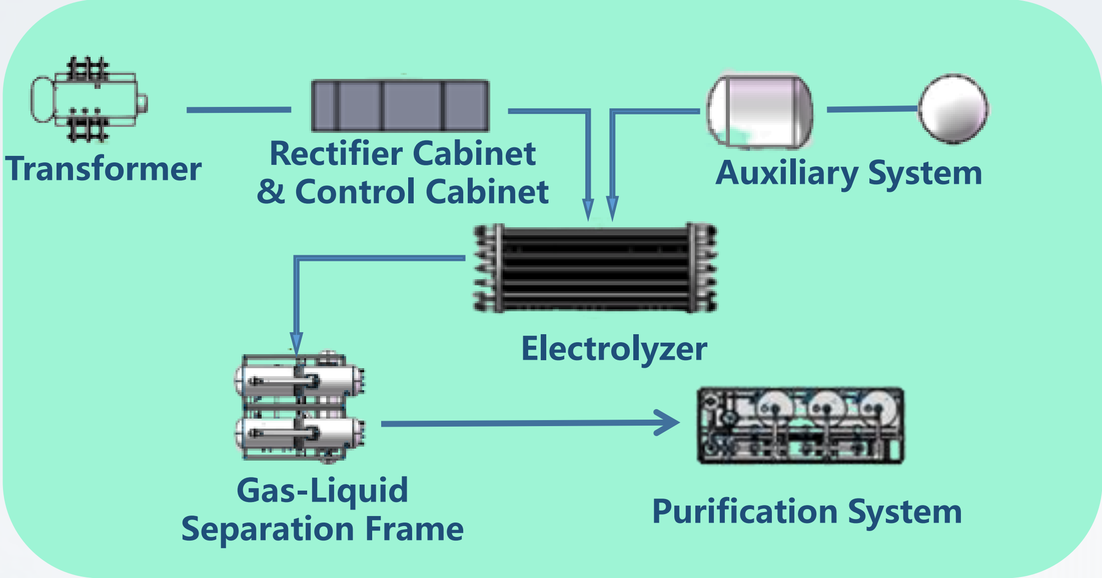
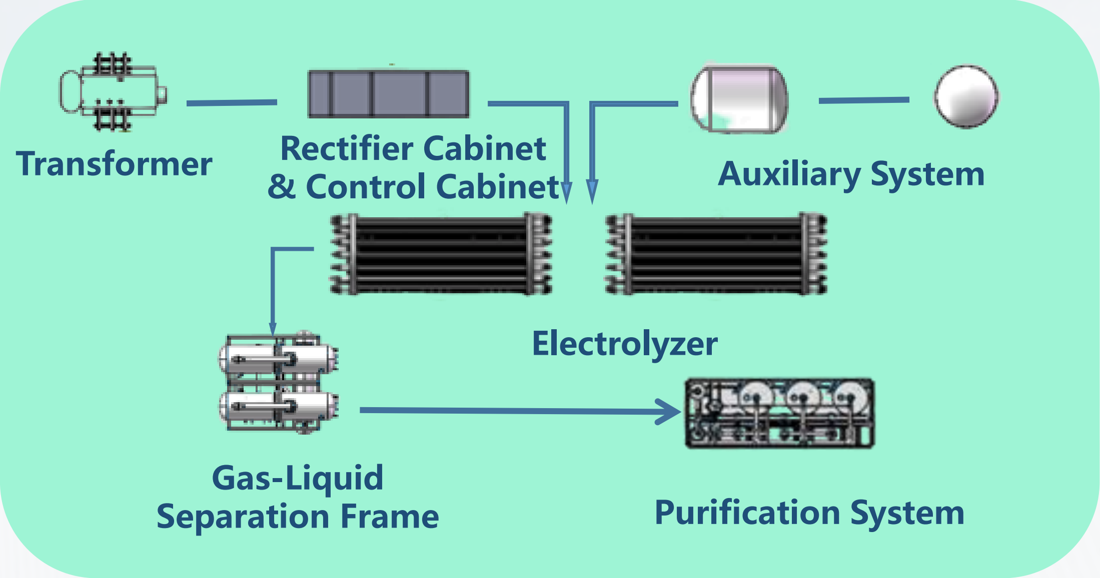
Product Parameter	
H_2 capacity (Nm^3/h)	0.3-1300
Stack pressure(Bar)	16
Current Density(A/m^2)	2000-6000
DC power consumption (KWh/m^3) approx.	4.6
H_2 purity(%)	99.8-99.999

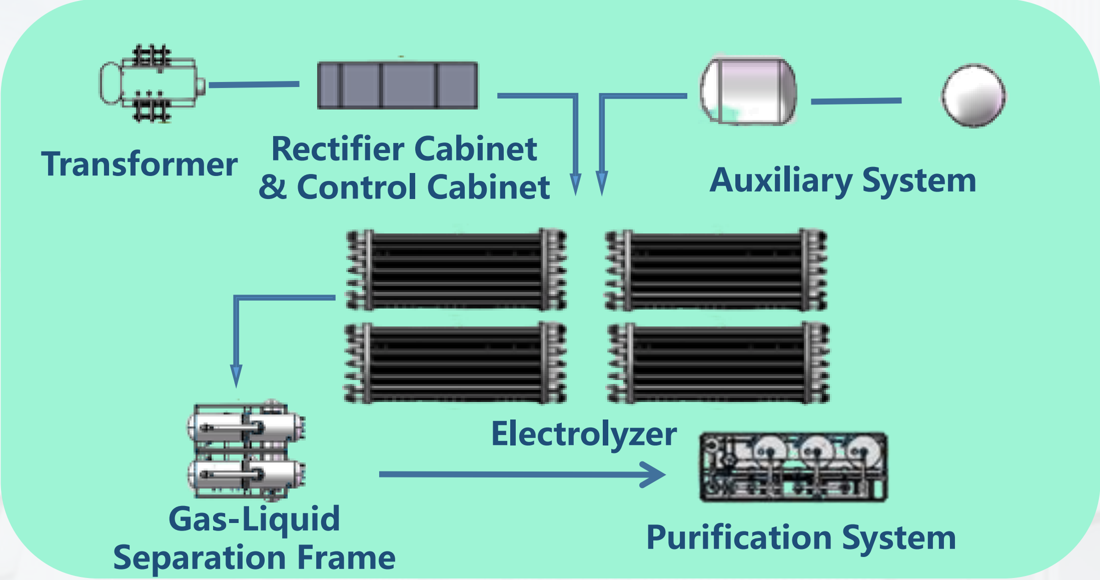
Product Development Trend

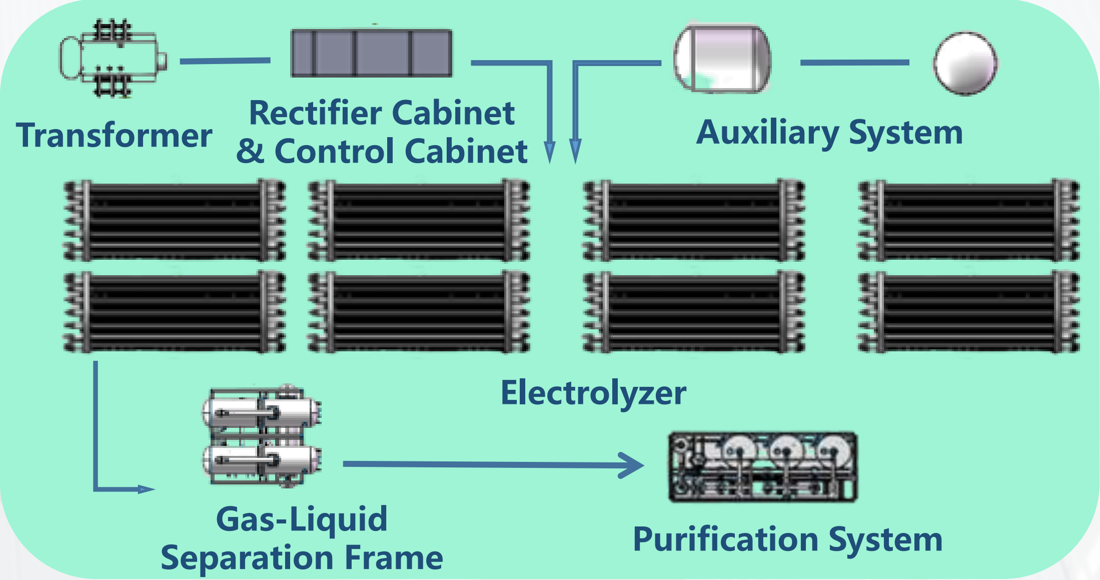


Product Development Trend- Integrated System

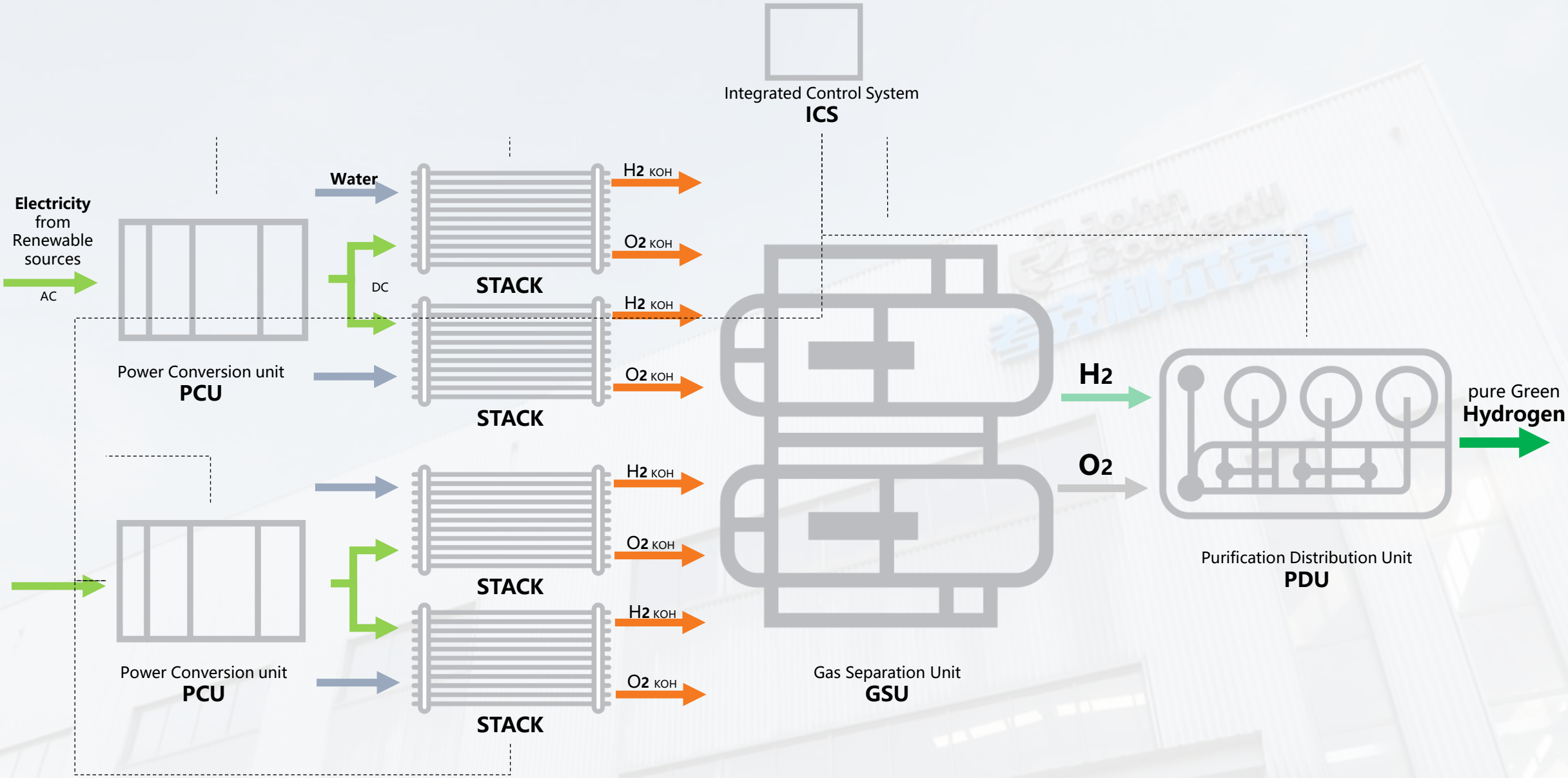








20MW electrolyser system overview



Product -Electrolyzer

- High current density
- Compact structure, Saving occupied space
- Large effective surface of the negative electrode
- Flange connection at outlet to ensure the gas tightness

- The electrolyser supplied to Guangdong Heyuan project has been operated for 26 years without any overhaul.

- Hydrogen and oxygen separator is made of Nickel Alloy to prevent corrosion and leakage of the vessel.

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04 SHOWCASES

TSMC Project –Air Liquide EPC

4 sets of 1000Nm³/h and 1 set of 600Nm³/h customized large-scale equipment supplied

Beijing 2022 Winter Olympic Project

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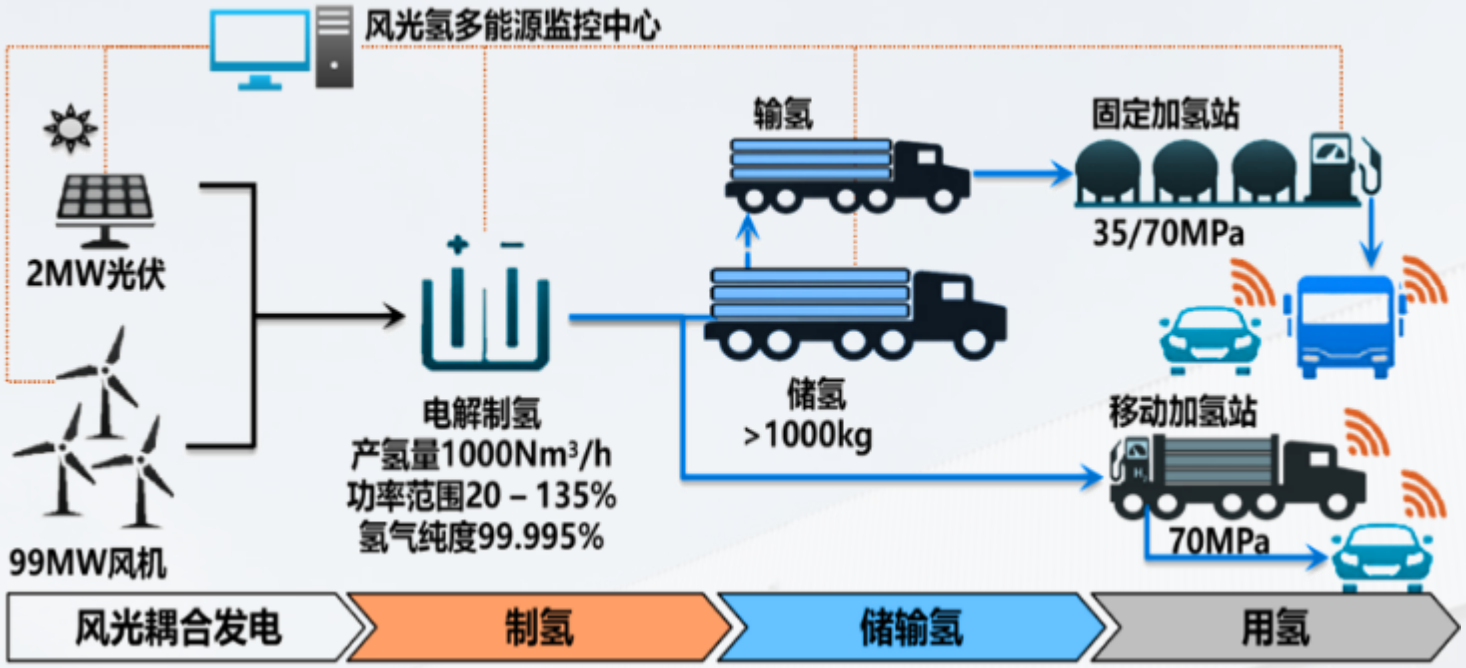

- The project is organized by China Ministry of Science and Technology
- MW level Wind-solar coupling generation, storage and usage of Hydrogen system demonstration project
- Project is located in Zhangjiakou, Hebei Province
- **1st 1200 Nm³/h** of hydrogen capacity is designed for single stack
- HRS for Beijing 2022 Winter Olympic Game

Baofeng Energy Project

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- Green Hydrogen is generated by photovoltaic
- **First Two-to-One frame** is applied in hydrogen production in this project
- Total capacity of this project 150MW

- **50% (15MW)** equipment by CJH is supplied in first phase (3:3)
- **70% (70MW)** equipment by CJH is supplied in second phase (14:5)
- **100% (25MW)** equipment by CJH is supplied in third phase (5:0)

Huaneng Demonstration Project

- **1st 1300Nm³/h** electrolyzer successfully developed
- Current density can reach to 6000A/㎡
- Compact design

The 19th Asian Games （Hangzhou）Project

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- In the 19th Asian Games in Hangzhou, CJH made full use of The Jiangdong flexible DC distribution network supply system to **build a new electro-hydrogen coupling comprehensive energy system**.

Tsinghua University Project

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- **First Four-to-One frame** designed for Tsinghua academician team for eletrolyzer experiments
- Mainly focused on research of alkaline water electrolysis Hydrogen production including catalyzer, membrane and electrolyzer structure
- Improve performance of alkaline water electrolysis Hydrogen production system
- Develop large scale electrolyzer of renewable energy

Sinopec Project(Four-to-One)

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- **Four-to-One frame** first industrial application in **national large scale green hydrogen** project by photovoltaic power with annual capacity of hydrogen output 20,000t
- **Green Hydrogen** supplied to TAHE refinery and replaced hydrogen processed by gas and fossil energy
- Total capacity of this project: 52 stacks (260MW)
- 24 stacks (120MW, approx. 50% share of the order) delivered by CJH

AM Green Kakinada Project

640 MW, One of the world's largest green ammonia projects

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AM Green places India’s largest electrolyzer order with John Cockerill Hydrogen for one of the world’s largest green ammonia projects. AM Green achieved Final Investment Decision (FID) for this first million-ton green ammonia project to be produced with 1.3 GW of electrolyzers. John Cockerill Hydrogen will supply advanced pressurized alkaline electrolyzers, of 640 MW capacity in phase 1.

AM Green, incorporated by the founders of Hyderabad-based Greenko Group, is one of India’s leading energy transition solutions providers

Application Industry and Customers

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New Energy
Hydrogen metallurgy
Synthetic ammonia/methanol

Shell
中国石化 SINOPEC
中国华能集团有限公司 CHINA HUANENG GROUP CO.,LTD.
国家能源集团 CHN ENERGY
宝丰能源 BAOFENG ENERGY
T.EN TECHNIP ENERGIES
greenko

Thermal Power
Petroleum refining
Hydrogenation station

Air Liquide creative oxygen
中国华电 CHD
中国国电 CHINA GUODIAN
大唐集团公司 CHINA DATANG
中电投集团公司
华润电力 CR Power

Electronics & Semiconductors
Polysilicon
Agriculture & Food

ENGIE
CETC 中国电子科技集团公司
LESI
东方希望 EAST HOPE
协鑫 GCL
Tsinghua University

Steel & Glass & Non-ferrous metals
Pharmacy
Scientific research

福耀集团 FUYAO GROUP
CNMC
HBIS 河北钢铁集团
攀钢集团 PANGANGGROUP
南玻集团
MESSER
同济大学 TONGJI UNIVERSITY

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05 CERTIFICATIONS & HONORS

Participate in the formulation of national standards

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- Minimum allowable values of energy efficiency and energy efficiency grades for hydrogen producing systems by water electrolysis.
  GB 32311-2015
- Specification of water electrolyte system for producing hydrogen
  GB/T 19774-2005
- Methods for performance evaluation of small-size integrative hydrogen energy system
  GB/T 26916-2011
- Hydrogen and compressed natural gas (HCNG) blended as vehicle fuel
  GB/T 34537-2017
- Safety technical regulations for hydrogen refueling station
  GB/T 34584-2017
- Fuel specification for proton exchange membrane fuel cell vehicles—Hydrogen
  GB/T 37244-2018
- Technical conditions of pressurized water electrolysis system for hydrogen production
  GB/T 37562-2019
- Technical conditions of pressurized water electrolysis system for hydrogen production
  GB/T 37563-2019
- Hydrogen Top Runner Program Evaluation Guidelines of Alkaline Water Electrolysis System for Hydrogen Production
  T/CAB 0166-2022
- Carbon Footprint Evaluation Methods and Requirements of Alkaline Water Electrolysis System for Hydrogen Production
  T/CAB 0245-2023
- Operation management guide for the industrial water electrolysis hydrogen production system -The pressurized alkaline water electrolysis
  TCECA-G 0255—2023
- Technical specification for woven mesh electrode for alkaline water electrolysis hydrogen production
  T/CAPID 010-2024

Quality Certifications

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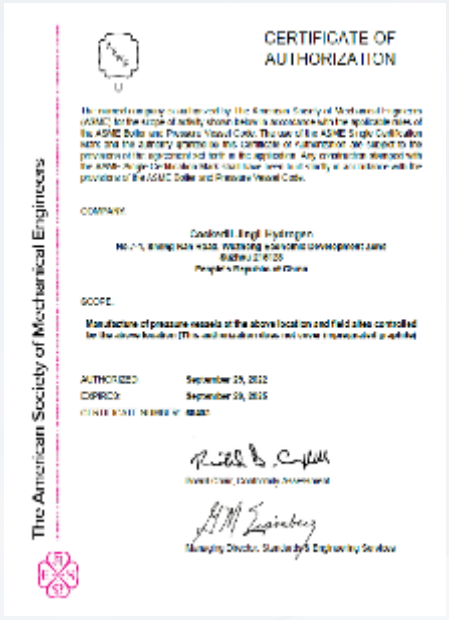


ASME certification

CE certification

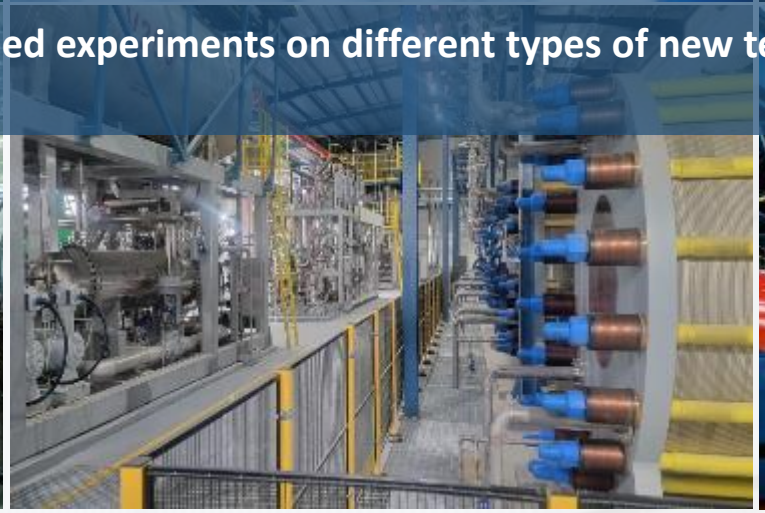
ISO9001、ISO45001、IS014001

DEKRA certification

R&D








Established joint laboratories with Tongji University and Suzhou University,

Conduct applied experiments on different types of new technologies.

Patents (60) and Honors

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Thank you!

www.cjhydrogen.com