碳能科技
CARBON ENERGY

E-SAF Production Using Ocean Carbon

Peng Kang

Carbon Energy Technology Co., Ltd

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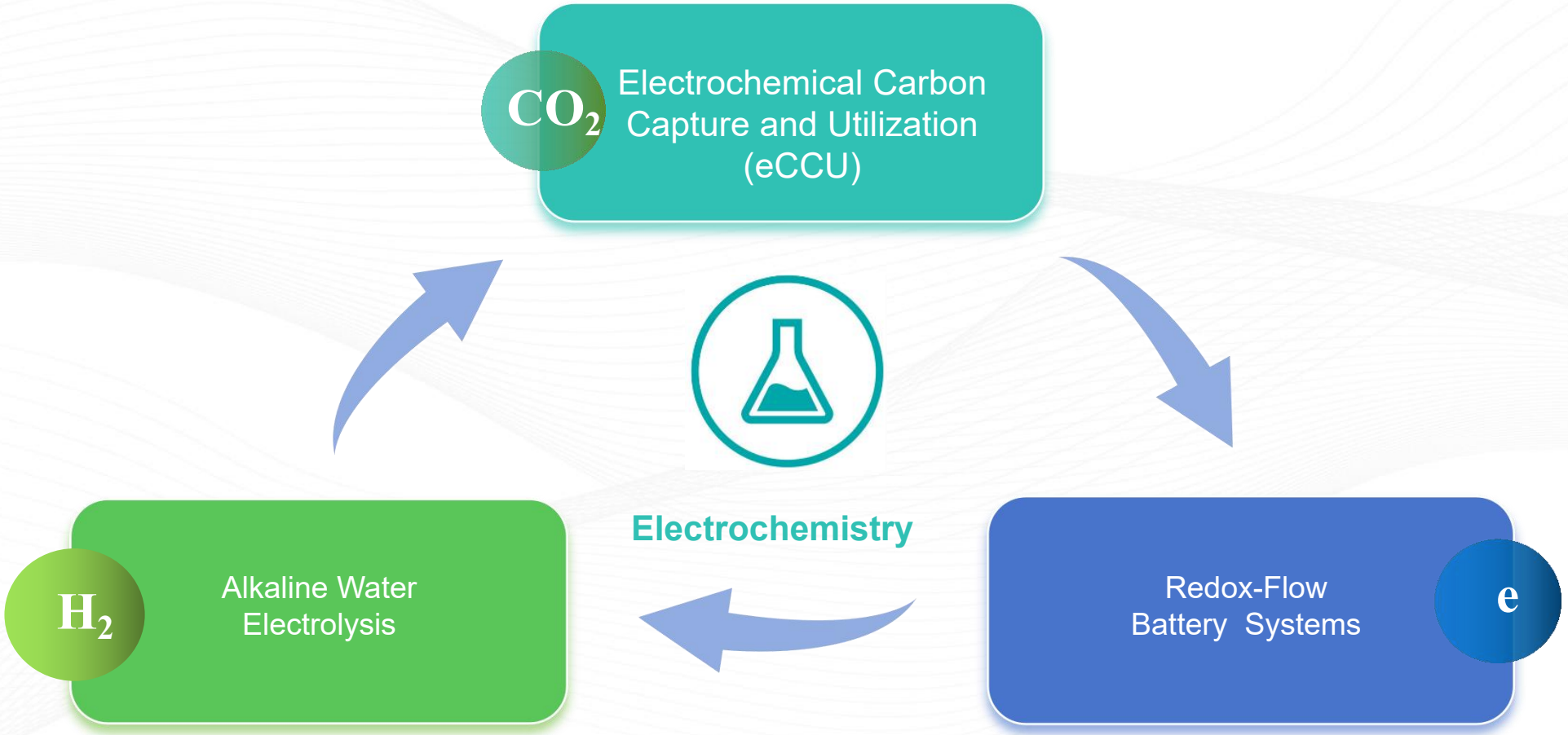
The company's business secrets shall not be disclosed

BUSINESS



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E-CCU

Renewable

Industry

CO_2

H_2 O

eCCU

Syngas

Chemicals

Fuels

E-MeOH

E-SAF

E-Methane

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E-SAF

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Self-developed technology	Self-developed technology	Co-developed technology
Electrochemical Ocean CO_2 Capture	Electrolysis of CO_2 to syngas	SAF synthesis
Seawater New energy Offshore wind	Blue carbon New energy Offshore wind	Green syngas ($CO+H_2$)	Sustainable Aviation Fuel (SAF)

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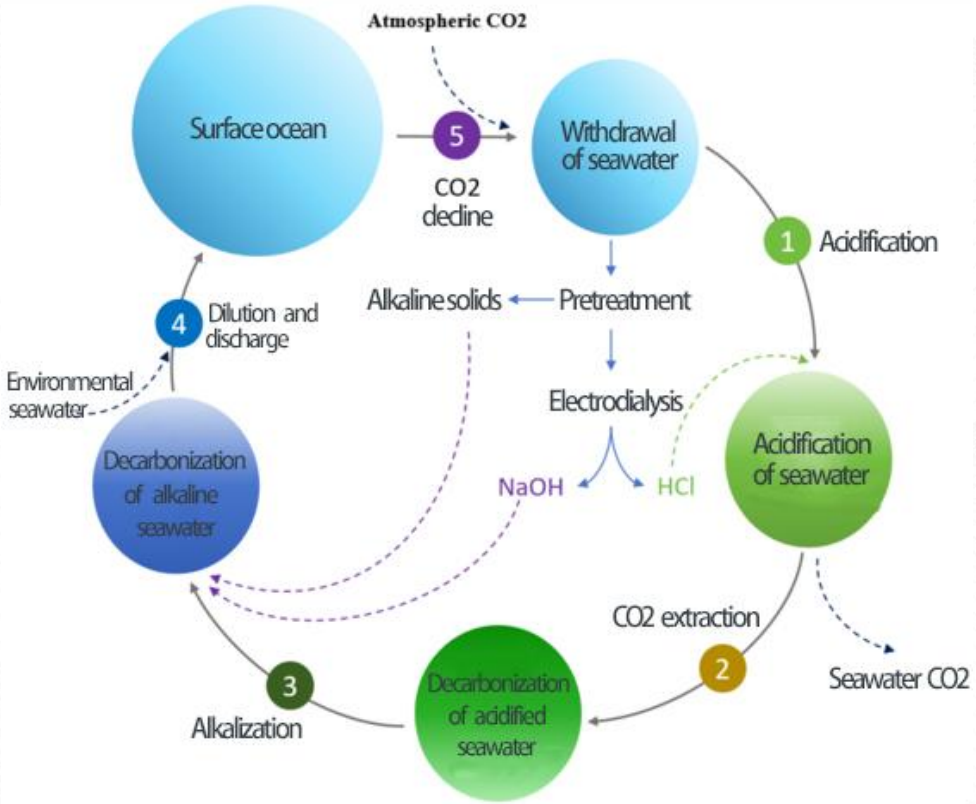
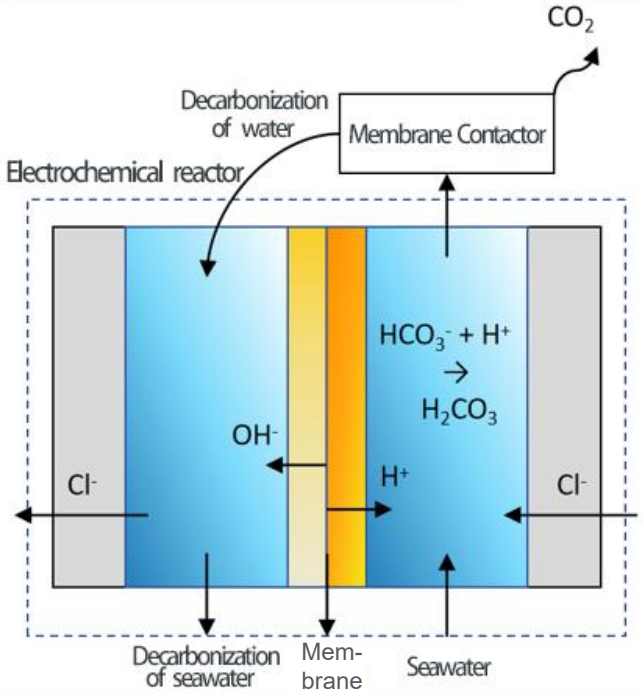
TECHNICAL PRINCIPLE

Dissolved inorganic carbon (DIC) in seawater : CO_2 (aq), bicarbonate (HCO_3^-, >85%) and carbonate (CO_3^{2-}).

Total CO_2 concentration is 130 times higher than atmospheric CO_2.



Schematic diagram of the DOC process flow



Schematic diagram of the structure of an electrochemical reactor with membranes

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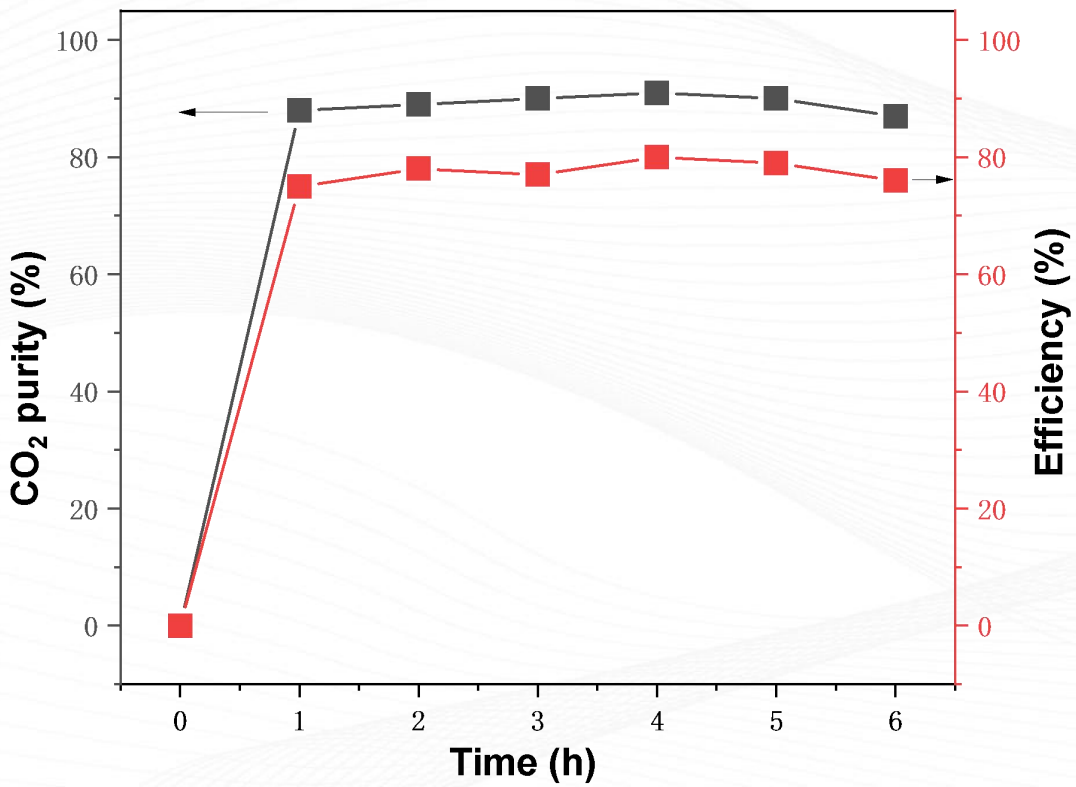
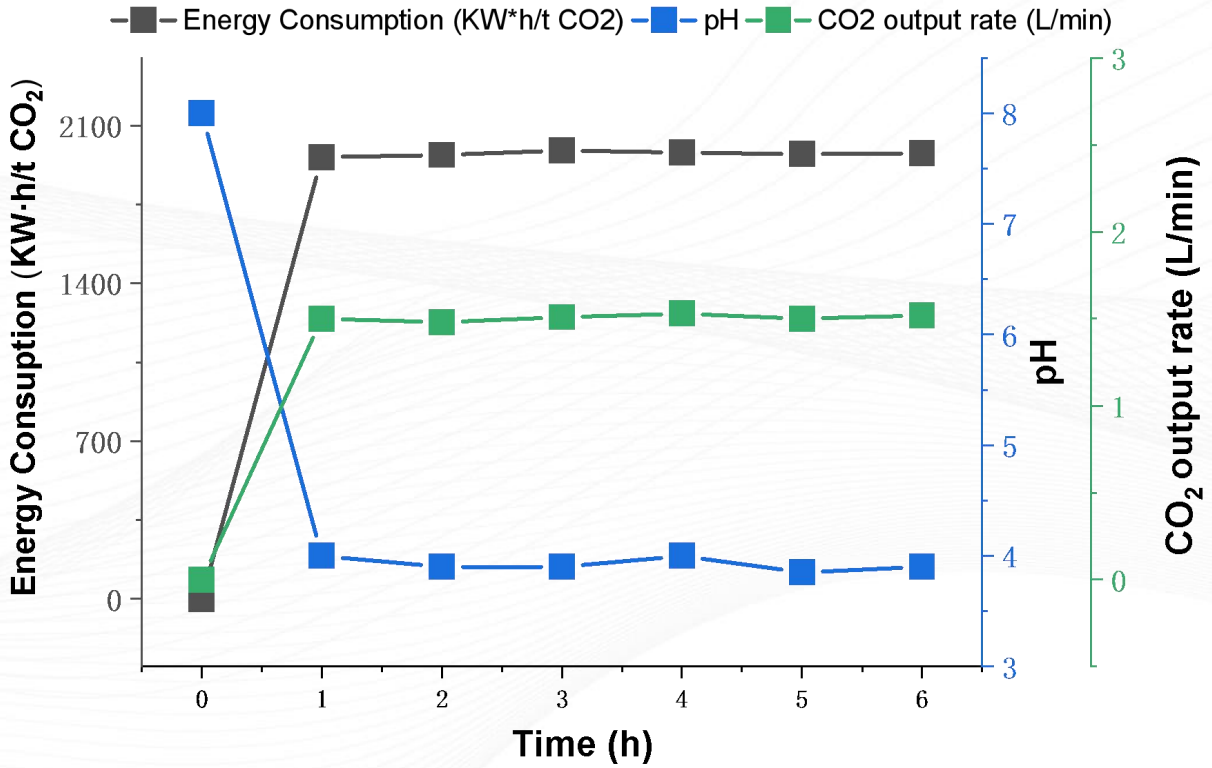
PROGRESS IN TECHNOLOGICAL DEVELOPMENT



CE-DOC system energy CO_2 purity and extraction efficiency



CE-DOC system energy consumption and CO_2 output rate

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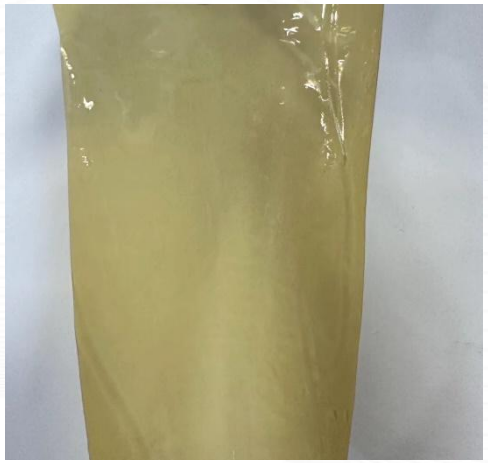
PROGRESS IN TECHNOLOGICAL DEVELOPMENT



Ion exchange membranes

Electrochemical reactor

CO_2 generators

Treatment for Single Unit	1000 Tons/year
Purity of CO_2	≥ 95 %
Power consumption	≤ 4.5 kWh/Nm3
Lifetime of the ion exchange membrane	4~5 years

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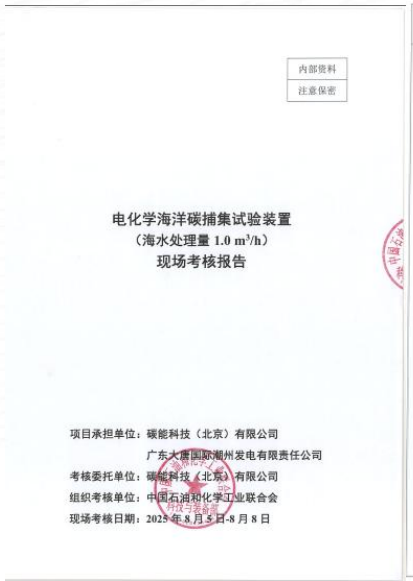
PROGRESS IN TECHNOLOGICAL DEVELOPMENT

Electrochemical ocean carbon capture test platform

Guangdong project site

- CO_2 extraction: 43.4 NL/h
- CO_2 extraction rate: 81.1%
- DC power consumption: 5.8 kWh/Nm^3 CO_2


内部资料
注意保密

电化学海洋碳捕集试验装置
（海水处理量 1.0 m³/h）
现场考核报告

项目承担单位：碳能科技（北京）有限公司
广东大唐国际潮州发电有限责任公司
考核委托单位：碳能科技（北京）有限公司
组织考核单位：中国石油和化学工业联合会
现场考核日期：2023 年 8 月 5 日-8 月 8 日


组织考核单位意见

同意考核意见

主管领导签字：

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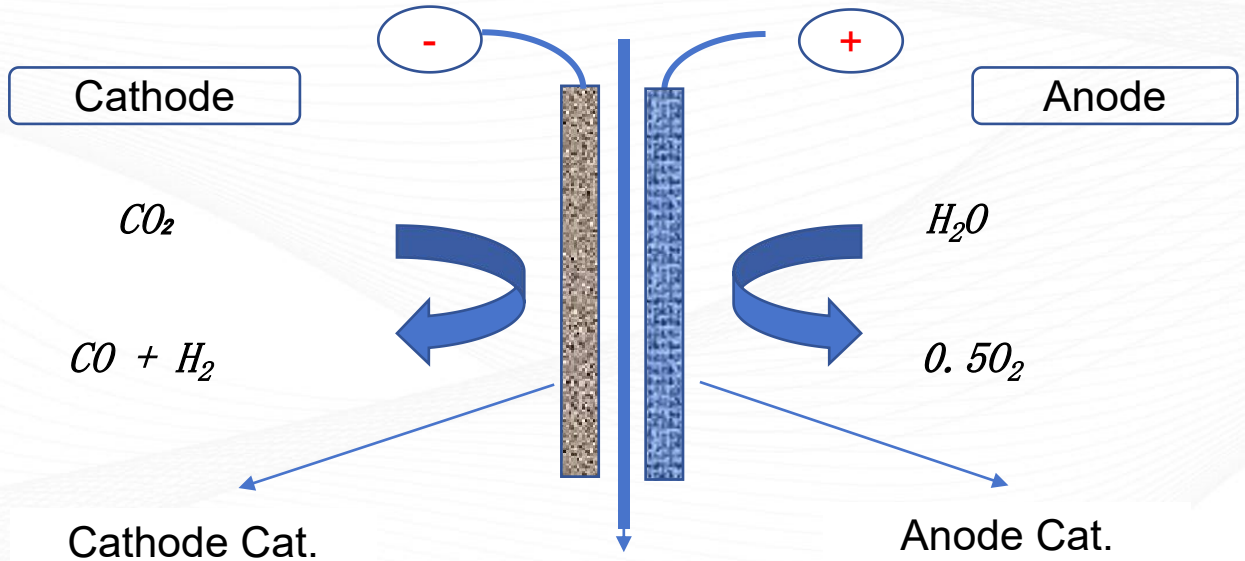
CO_2 -To-Syngas

H_2O+CO_2 —cat. / e→ Synthesis Gas —cat.→ MeOH; CH4; F-T liquid
Biodegradable materials



Syngas ($CO+H_2$): Important feedstock for chemicals , eg. methanol, olefin, wax, synthetic fuels

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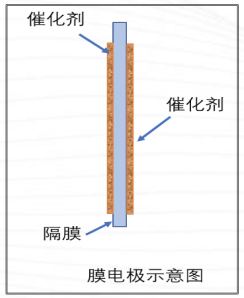
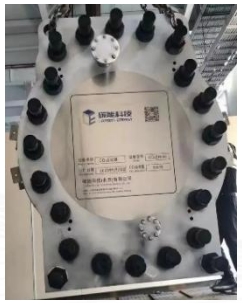
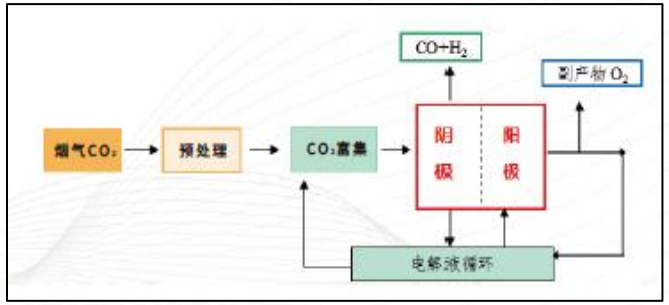
■ Catalyst



■ Electrolysis reactor



■ Electrolytic process



Single-stack processing	1000 tons/year
Input concentration of CO_2	10%~100%
Purity of synthesis gas	≥ 85%
CO/H_2 ratio within synthesis gas	0.2：1~1：1
Electricity consumption per standard cubic meter of synthetic gas	≤ 6.5kWh
Service life of electrodes	5~7year

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CORE TECHNOLOGY: ELECTROLYSIS OF CARBON DIOXIDE FOR SYNGAS PRODUCTION

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CO_2 Processing Capacity: 1 tons/year	30 ton/year	100 ton/year	1000 ton/year
Atmospheric pressure electrolysis H/C ratio 0.28-0.58	**Atmospheric pressure electrolysis** H/C ratio 0.52	**Pressurized electrolysis** H/C ratio 0.3-0.6	**Pressurized electrolysis**
			
Flue gas CO_2 from power plants (2023)	Coal chemical industry CO_2 (2020-2024)	High-purity CO_2	Flue gas CO_2 from power plants (2025)

Certified by the China Petroleum and Chemical Industry Federation for its scientific and technological achievements, and selected for inclusion in the National Catalog of Recommended Energy-Saving and Carbon Reduction Technologies and Equipment in the Industrial and Information Technology Sectors issued by the Ministry of Industry and Information Technology

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PROGECT-eCCU

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The world’s Largest Project-eCCU

This project will apply integrated technology for carbon dioxide enrichment and conversion and conduct industrial demonstration research on the electrolysis of 1,000 tons of carbon dioxide into synthesis gas per year.

Research and demonstration project on key technologies for carbon dioxide electrolysis to synthesis gas at Hengshan Power Plant

The project aims to develop an industrial technology for the conversion and utilization of tens of thousands of tons of carbon dioxide and is expected to open a new path for the resource utilization of carbon dioxide in the thermal power industry.

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GREEN AVIATION FUEL PRODUCTION

Green electricity

Water electrolysis for hydrogen production

Green electricity

Blowdown gas、process water

H_2

H_2

LPG

Naphtha

SAF

eDOC

CO_2 electrocatalytic conversion

Fischer-Tropsch synthesis

Raw wax

Hydrocracking/isomerization

Oil fractionation

Recycle tail oil

Raw syngas

syngas

Light oil, heavy oil

Gas decarbonization

Hydrogenation dewaxing

eDOC+FT 35,000 tons/year SAF Production

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SAF PROJECTS

Timeline	2026	2027	2030
Project	Pilot	Plant I	Plant II
DOC Capacity (tpy)	300	100,000	300,000
SAF Production (tpy)	100	35,000	100,000
SAF Cost Estimate (USD/t)	2121	1881	1567

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COMPANY

Carbon Energy Technology (CE) is a research company dedicated to the development of transformative carbon neutrality technology, founded in 2015 by Dr. Peng.

CE provides **carbon neutrality solutions with positive economics**. Through key catalysts, reactors and advanced process, CE can efficiently convert CO2 to green chemicals and materials, such as synthesis gas, synthetic oil and methanol, contributing to a “net-zero” future.

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CAMPUS

HAIDIAN R&D CENTER

Located in Yiyuan Industry Base, Haidian, Beijing, as the main office, R&D lab and engineering design.

XI'AN MEMBRANE PRODUCTION BASE

Xi'an Carbon Energy Technology Co., Ltd. focuses on the production of membrane materials for green hydrogen.

FANGSHAN PILOT BASE

Located in Fangshan, Beijing, an 800-square-meter pilot workshop, equipped with large reactor evaluation platforms, process test platform, undertakes the test and operation of large electrolytic reactors, electrolytic process testing, and reactor assembly.

JINHUA ELECTRODE MANUFACTURING PLANT

To manufacture electrodes for alkaline electrolyzers with an annual production of 200,000 square meters, landed in the Pujiang Economic Development Zone.

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塑造
可持续的未来

THANKS

WeChat Official Account

Carbon Energy Technology Co., Ltd.

Address： B1-210, 80 Xingshikou Rd, Haidian, Beijing, 100195 China
Web： http://www.carbonenergy.com.cn
Phone：400-656-1088
Email： tnkj@carbonenergy.com.cn

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