Status of CCUS Development in China

Japan CCS Forum 2022

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KEY MESSAGES

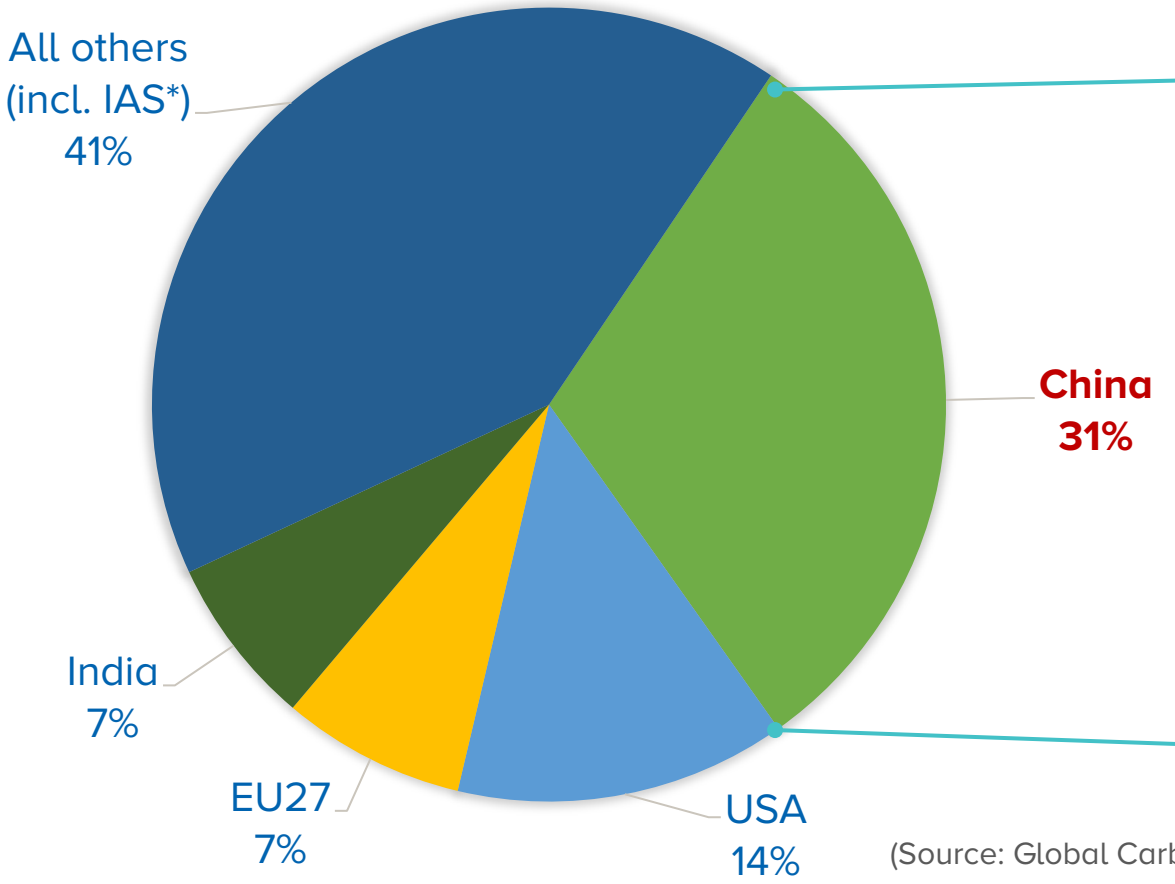
- China cannot achive carbon neutality without CCUS.
- A great momentum has been happening in China, primarily driven by the State-Owned-Enterprieses, since 2021.
- More policy work needs to be done so this momentum can last.
- International engagement and collaboration are very much welcomed in China, but COVID is making this hard.

KEY CLIMATE TARGETS & PROGRESS IN CHINA

- Peaking carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060.
- Lower carbon intensity by “over 65%” in 2030 from the 2005 level. (50.8% in 2021)
- Share of non-fossil fuels in primary energy consumption to “around 25%” in 2030. (16.6% in 2021)
- Increase the installed capacity of wind and solar power to over 1,200 GW by 2030. (635 GW in 2021)

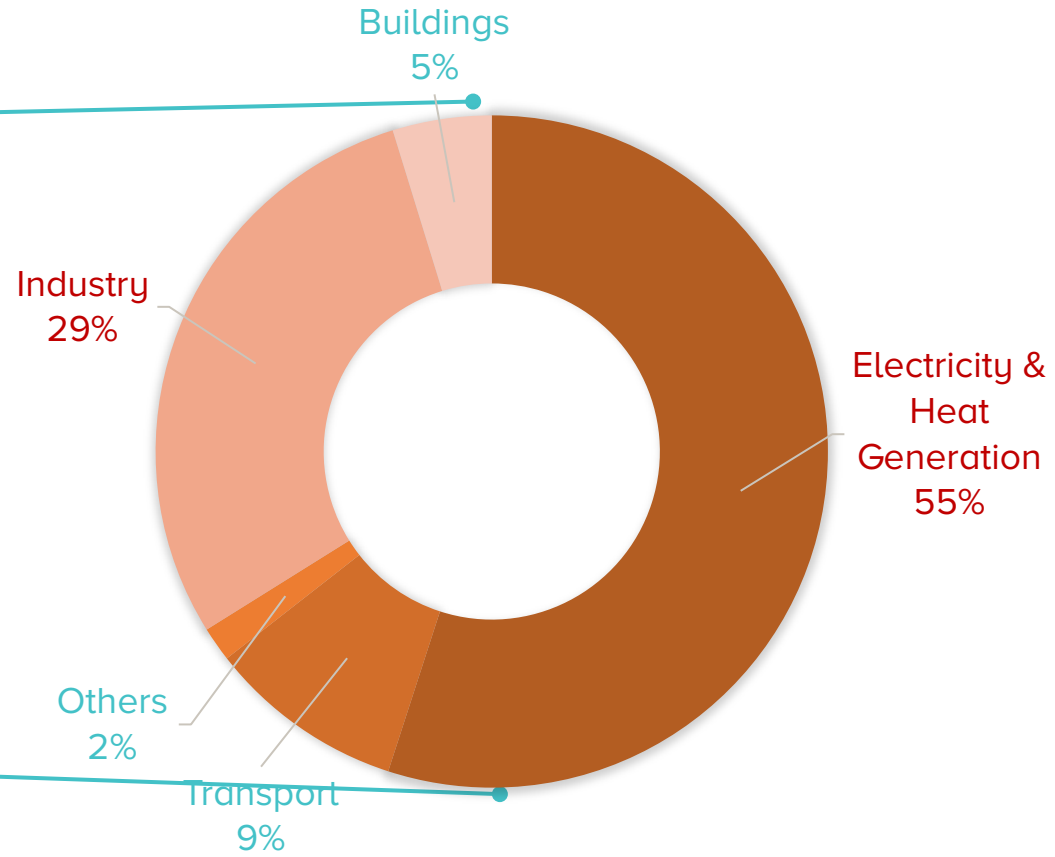
CCUS IS ESSENTIAL

GLOBAL FOSSIL CO_2 EMISSIONS IN 2020



(Source: Global Carbon Budget, 2021)

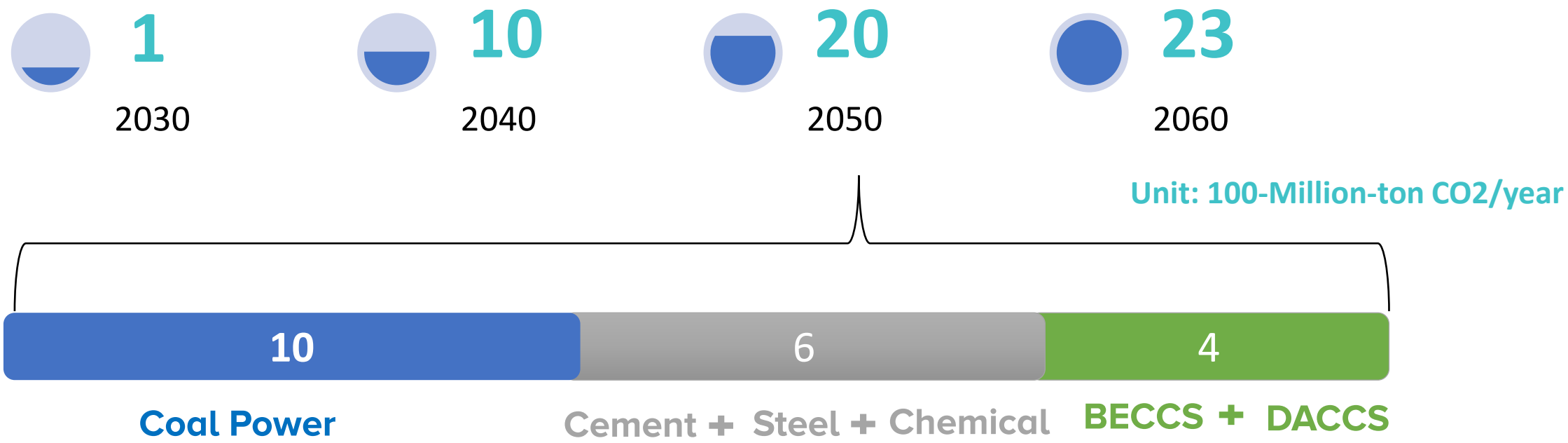
CHINA'S FOSSIL CO_2 EMISSIONS BY SECTORS IN 2019



(Source: IEA, 2021)

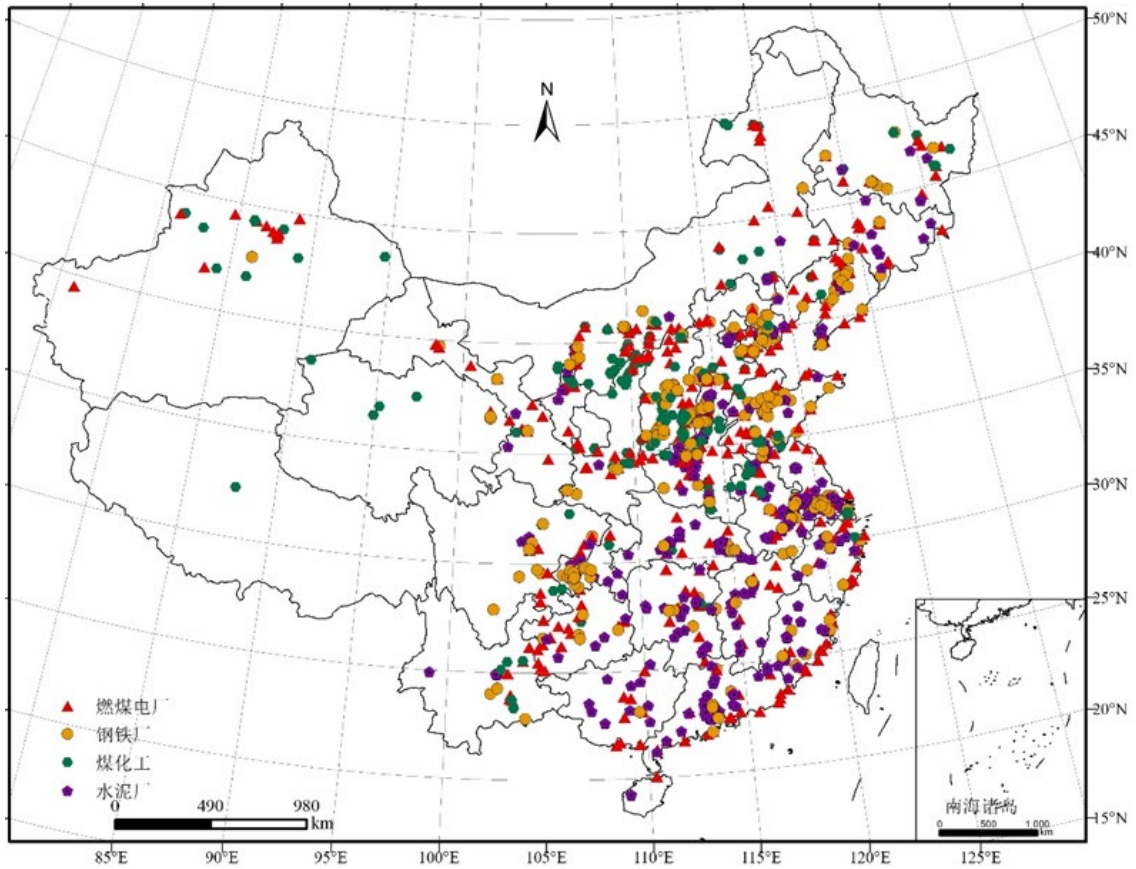
CCUS UNDER CHINA'S CARBON NEUTRALITY

- CO_2 Reductions Required through CCUS

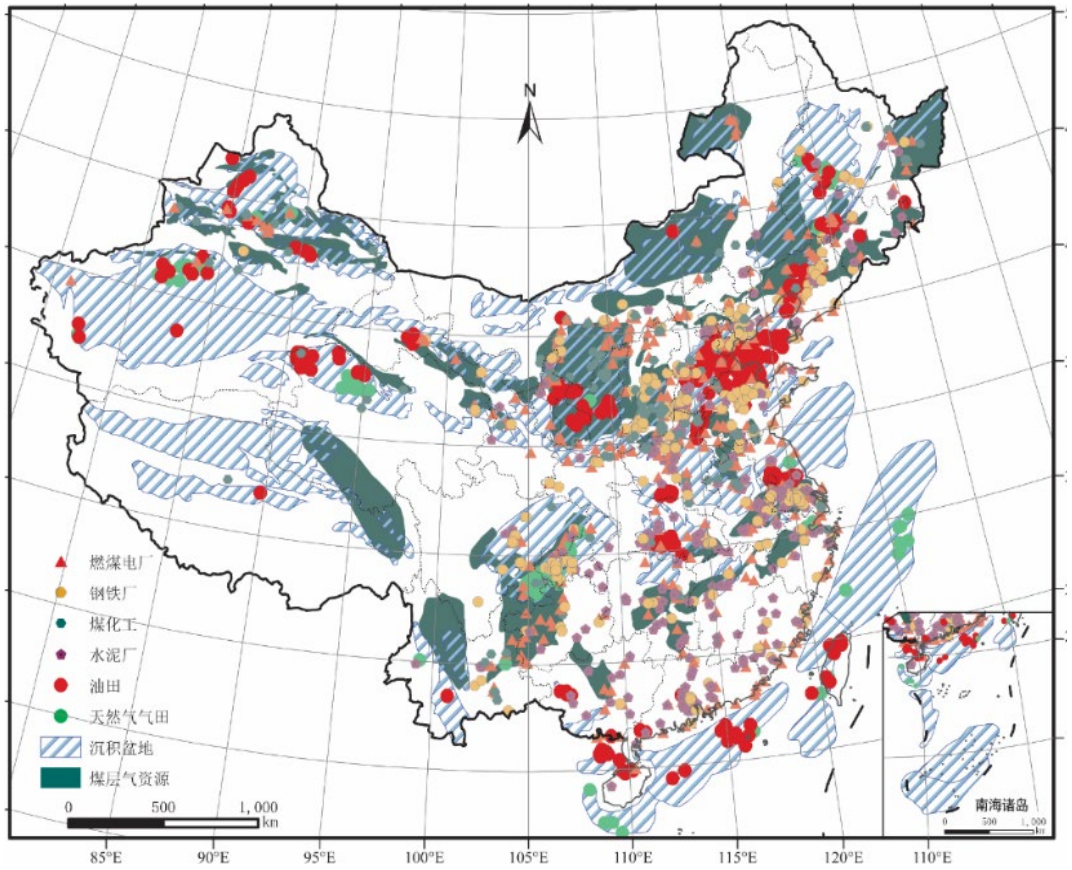


(Source: ACCA21)

CCUS SOURCE-SINK MATCHING IN CHINA



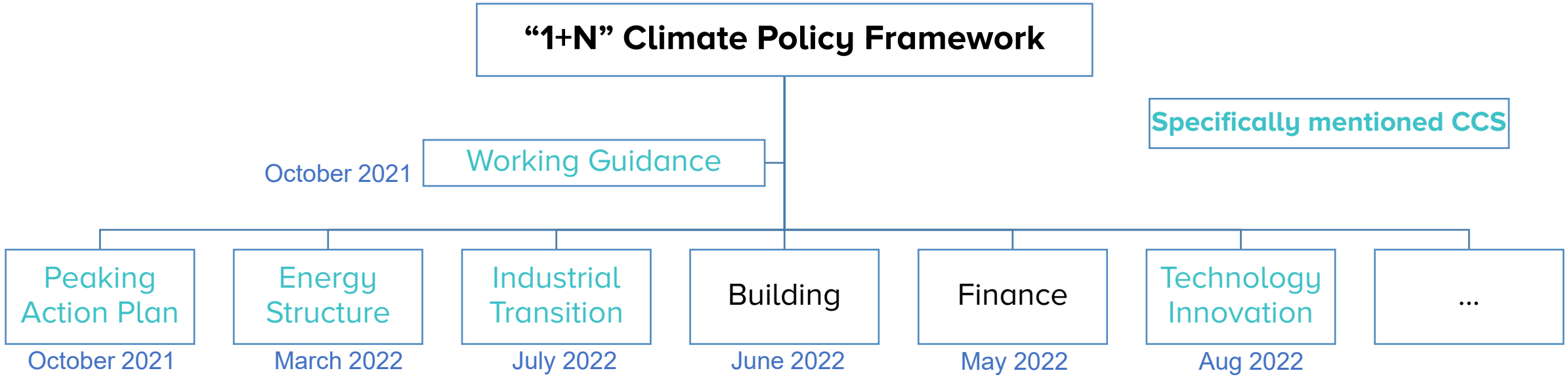
Emission Source Distribution



Source-Sink Match

(Source: Chinese Geological Survey)

POLICY SIGNAL IS CLEAR



- "...demonstration of major CCUS projects" is included in **the 14th Five-Year Plan**.
- **Key Working Priorities in Peaking Carbon Emission and Achieving Carbon Neutrality:** "Conduct R&D of low-cost CCUS and other technologies, and promote the construction of million-ton integrated CCUS demonstrations."
- **Science & Technology Development in Support of Carbon Targets**: "Carry out full process CCUS demonstrations develop CDR technologies."

ONE SPECIFIC POLICY INSTRUMENT

Carbon Emission Reduction Facility

People's Bank of China

Start of operation: Nov 2021

PBOC provides low-cost funds to financial institutions and guide the financial institutions to extend carbon reduction loans at rates close to the loan prime rate of the same maturity.

Foreign banks were recently being added in the scheme. The first two are Deutsche Bank and Societe Generale.

CCUS is included. The other two are energy saving and renewable projects.

NOW WITH THE MOMENTUM

09/2020

China announced its carbon neutrality target.

07/2021

SINOPEC announced China's 1st megaton scale integrated project.

08/2021

CNOOC announced China's 1st offshore CO_2 storage project.

09/2021

Huaneng announced China's 1st megaton scale coal power CCUS project.

10/2021

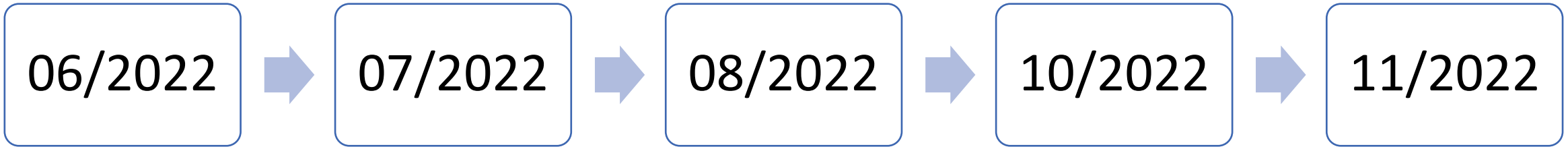
CCUS was incorporated into China's highest carbon neturality policy guidance.

THE MOMENTUM - 2

CNOOC, **Shell**, & **Exxon** announced a joint study for a large-scale offshore CCS hub in Guangdong.

China's **1st 1Mtpa integrated CCUS project** commence full operation

Sinopec, **Baowu Steel**, **BASF**, & **Shell** announced a feasibility study of developing a 10Mtpa CCUS project in East China Region.



China's 1st CCUS project in **steel** sector began to construct.

China's 1st CCUS project from **glass furnance** started full operation

PROJECT SUMMARY

90+

All pilots & demos with different scales & stages

30+

Carbon capture-related

30+

Carbon utilization-related

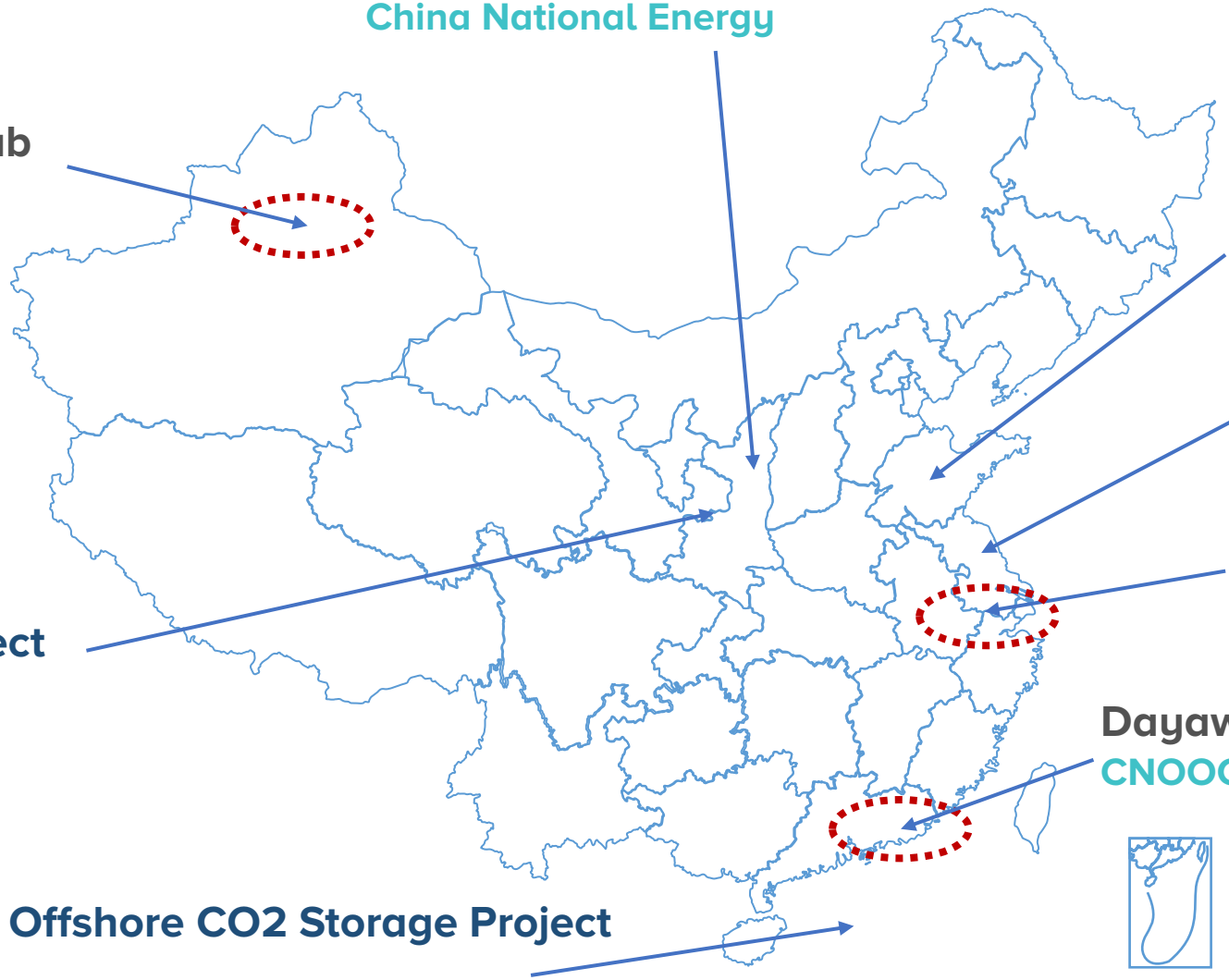
4 Mtpa

Operational capture capacity

2 Mtpa

Operational injection capacity

KEY PROJECTS



Jinjie Coal Power CCUS Project
China National Energy

OGCI Northwest Hub
CNPC

SINOPEC Qilu-Shengli
Sinopec

Taizhou Coal Power
China National Energy

Yangtze Delta CCUS Hub
Sinopec, Baowu, Shell, BASF

Huneng Longdong Project
Huaneng

Dayawan Offshore Hub Study
CNOOC, SHELL, ExxonMobil

Enping Offshore CO2 Storage Project
CNOOC

JINJIE COAL POWER CCUS PROJECT

Owner: China National Energy

Location: Yulin, Shannxi

Status: China's largest operational coal power CCUS project since July 2021

Technology: Post-combustion + chemical absorption

Scale: 150 Ktpa

Released capture cost: 42 USD/t

Various utilization


(Source: presenter)

(Source: presenter)

TAIZHOU COAL POWER CCUS DEMONSTRATION

Owner: China National Energy

Location: Taizhou, Jiangsu

Status: Main construction is expected to be completed by Dec 2022.

Technology: Post-combustion + chemical absorption

Scale: 500 Ktpa

Designed capture cost: 33 USD/t

SINOPEC QILU-SHENGLI PROJECT

Owner: SINOPEC Location: Shandong

Status: China's largest operational 1 Mtpa CCUS project since August 2022

Technology: Coal-gasfication hydrogen

Scale: 1 Mtpa Utlization: EOR Tranportation: Trucks for now (100km-pipeline is under construction)


(Source: SINOPEC)


(Source: SINOPEC)

HUANENG LONGDONG PROJECT

Owner: Huaneng Location: Gansu

Status: China's to-be largest 1.5 Mtpa coal power CCUS project / starts construction in Novmber 2022 / construction complete by the end of 2023

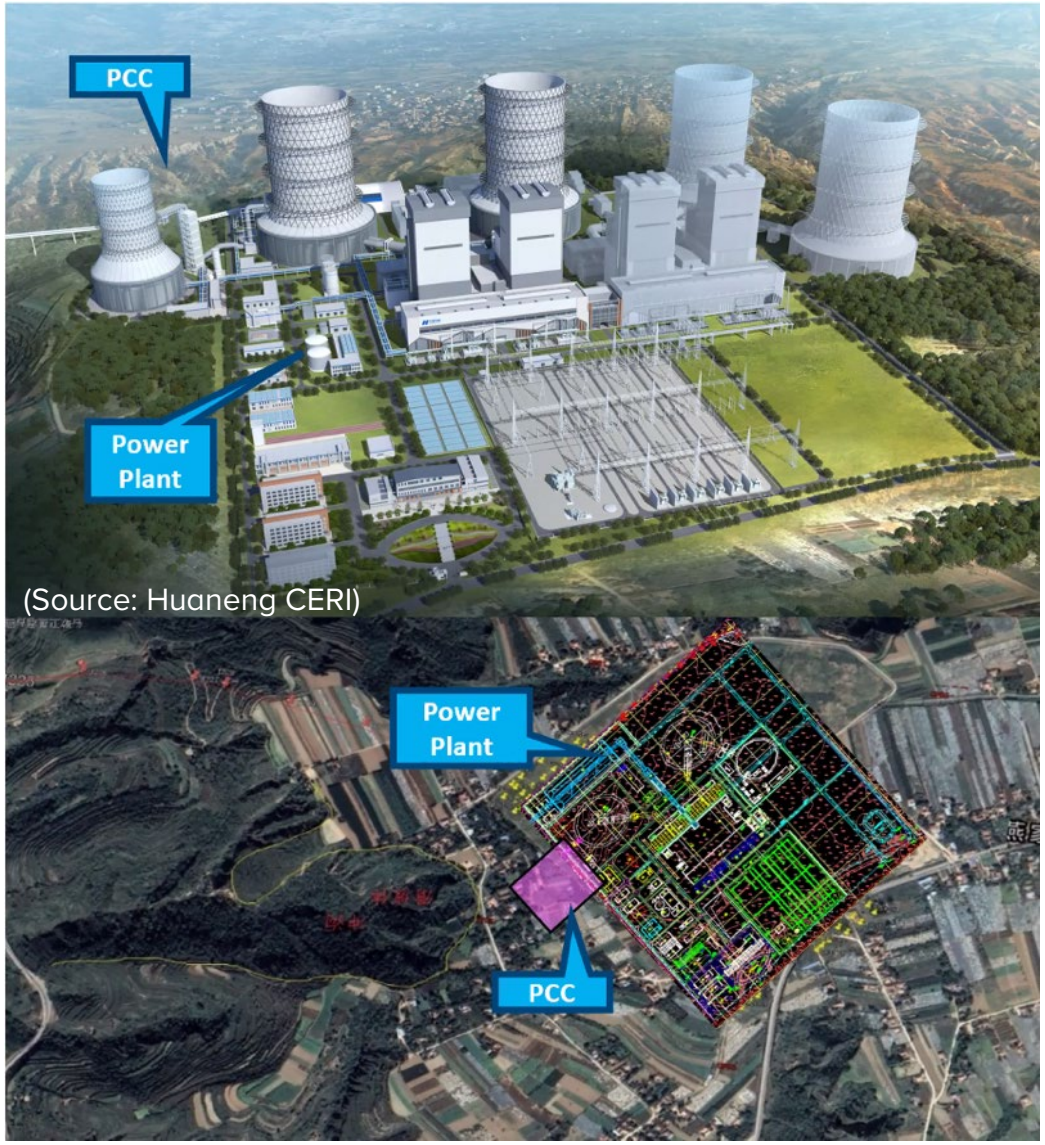
Technology: Post-combusion + chemical solvents

Scale: 1.5 Mtpa

Utlization: EOR + Geological Storage

Transportation: Pipeline

Key Designed Parameters:
Capture cost: <USD35/t CO_2;
Regeneration energy consumption: <2.3 GJ/t CO_2;
Solvent conumpstion: <1 kg/t CO_2



PROJECT – THE OTHER FIRSTS IN 2022

Project Owner	Type	Scale	Status
CNOOC	Natural gas production + offshore storage	300,000 t/yr	Construction
China Building Materials Group	Glass furnace	50,000 t/yr	Operation
Longking Enviroment Group	Waste-to-Energy	2,000 t/yr	Operation
Baotou Steel	Steel	500,000 t/yr	Construction

WHAT IS NEEDED NEXT

- Define the role of CCUS in China's long-term climate strategy and NDC.
- Develop more specific policy incentives to create a sustainable business model for CCUS.
- Develop CCUS laws and regulations that are recognized internationally.
- Governments need to support the establishment of transport and storage infrastructure.
- Encourage technology innovation and support RD&D programs.

Thank you

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