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# **CCUS Progress and Policy in China**

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### **China's carbon neutrality target**



 China aim to have CO<sub>2</sub> emissions peak before 2030 and achieve carbon neutrality before 2060.



Source: http://www.xinhuanet.com/photo/2020-09/22/c\_1126527690.htm



### The role of CCUS





Source: http://www.gov.cn/guowuyuan/2021-05/27/content\_5613268.htm

• On May 26, 2021, the first plenary meeting of the Carbon Neutralization Leading Group was held, chaired by Vice Premier Han Zheng. **CCUS technology** is one of the key technologies to achieve carbon neutrality.





**3 Project Demo** 

4 Global Cooperation





2 R & D Status

Outline

**Project Demo** 

Global Cooperation

Summary

### National CCUS policies : 2006-2020

#### A total of **33 relevant national CCUS policies** have been issued.

- 11th five-year period: focus on technology orientation, emphasizing CCUS as the key technology to deal with climate change.
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- 12th five-year period: the number of policies increase massively, and the policy content is constantly enriched.
- 13th five-year period: the policy is based on project demonstration, emphasizing the development of CCUS projects to large-scale, multi-utilization and integration.



### **Representative CCUS policies**

### Many ministries and commissions have issued a series

#### of policies and plans related to CCUS.

- Development Roadmap of CCUS Technology in China (2019)
- Technical Guide to Environmental risk Assessment for CCUS (Trial)
- The National Scientific and technological Innovation Plan of the 13th five-year Plan

#### **Continue to carry out national CCUS technology evaluation report.**

- Report on the Evaluation of carbon Utilization Technology in China
- Report on carbon capture, Utilization and Storage in China (Chinese and English version) (Annual)
- Special report on the fourth National Climate change Assessment report: CCUS Technology Assessment report
   Note: red indicates forthcoming document.







- The 14th five-year Plan: **Include CCUS** for the first time.
- Ministry of Ecological Environment: Encourage qualified regions and enterprises to explore the pilot and demonstration of the CCUS project.
- Ministry of Science and Technology: *The National Science and Technology Plan of the Fourteenth five-year Plan*
- Ministry of Ecological Environment: *Guidelines for promoting the Development of CCUS*.

## **CCUS** policies of provinces and enterprises

- 29 provinces have issued policies and plans related to CCUS.
  - Provincial Planning of CCUS in *Zhejiang Province*
  - *Beijing, Henan, Shanxi* and other provinces have proposed or are studying to build carbon neutralization demonstration zones.



- Sinopec Group, China Huaneng Group, etc. have carried out CCUS demonstration projects.
- China Datang Corporation, State Power Investment Corporation, China Baowu Steel Group, etc. have put forward the carbon peak target.









**Project Demo** 

Global Cooperation





Public finance sources of CCUS technology projects: National Science and Technology Support Plan, 973 Plan, 863 Plan, National Key Research and Development Plan, National Natural Science Foundation of China, etc.

Since 10th Five-Year Plan: investment in CCUS technology research and development have exceeded **3 billion yuan**.

Period	2001-2005	2006-2010	2011-2015	2016-2020
Capture (proj. no.)	3	3	6	4
Utilization (proj. no.)	5	7	6	5
Storage (proj. no.)	0	0	1	2
Total (RMB amount)	>3 billion			

### Paper and patent status



Paper Publication



#### Total Publications

- > 2000-2019 , **984 articles** published.
- > China ranks second in the world.



- Annual Publications
  - China overtook the United States in 2016.
  - China ranks first in the world.

#### Patent Application



world.



Total patent applications
 Annual patent applications
 1967-2018, 1067 patents

 applied.
 China ranks first in the
 China ranks first in the



#### Carbon Neutrality Technology Development Roadmap

- Five categories of carbon neutrality technologies: zero-carbon electricity, zero-carbon nonelectric energy, raw materials, fuel and process substitution, CCUS and carbon sinks, and integrated coupling and optimization.
- Key Research and Development special program "Research and Demonstration of Key Carbon Neutrality Technologies"
- **Carbon Peak and Carbon Neutrality Technology Innovation Action Plan**











### **Overview of CCUS demonstration projects in China**



#### **35 CCUS projects** with a capture capacity of more than **3 million t/a** and a

#### cumulative storage capacity of approximately 2 Mt CO<sub>2</sub>.

- CO<sub>2</sub> capture: power (12), cement (2), coal chemical industry and chemical fertilizer production.
- Transportation: tank car.
- **Storage:** saline aquifer.
- Utilization: EOR, ECBM , EUL, Mineralization, chemical, biological etc.





- OGCI-CNPC: Junggar Basin CCS hub in Xinjiang with a storage capacity of 0.2 to 3 Mt/a, and a storage capacity plan of 10 Mt/a by 2030.
- Taizhou Power Plant: a post-combustion capture demonstration project with a capture capacity of 0.5Mt/a, the largest carbon capture demonstration project in China with 70% costs.
- **Baowu Steel Group, Hebei Steel:** CCUS facility is under plan.
- Conch Cement Plant: CO<sub>2</sub> Deep Mineralization Maintenance experiment passed 72 hours of operation.





3 **Project Demo** 



**Global Cooperation** 



### **International cooperation**



- By strengthening international cooperation, CCUS development can be promoted in *policy formulation*, *business model demonstration* and *technology R&D*.
- International cooperation projects

Projects	Partners	Duration
China-Australia Geological Storage of CO <sub>2</sub> (CAGS)	GA	2010-
China-EU NZEC Cooperation	UK, EU, Norway	2007-
China-EU Carbon Capture and Storage Cooperation (COAC)	EU	2007-2009
Sino-Italy CCS Technology Cooperation Project(SICCS)	ENEL	2010-2012
China-US Clean energy Research Center	MOST, NEA, DOE	2010-2015
CSLF Capacity Building Projects	CSLF	2012-
China-Australia Geological Storage of CO2 (CAGS)	Australia	2016–2018
Horizon 2020: Low Carbon Industrial Production Using CCUS	Europe	2016–

### **International cooperation**



#### Policy cooperation between countries

- USA: China-U.S. Joint Statement Addressing the Climate Crisis
- Denmark: The 20th meeting of the China-Denmark Science and Technology Cooperation Joint Committee
- UK : The 10th meeting of the China-UK Joint Committee on Science and Technology Innovation Cooperation

#### International organizations



### Latest development









- The 11 Clean Energy Ministerial (CEM 11)
- The 5 Mission Innovation (MI 5)



- *H*<sub>2</sub>-*CCUS China report*
- *CCUS in clean energy transitions*



• Roadmap update for Carbon Capture, Utilization and Storage Demonstration and Deployment in the People's Republic of China

ipcc

• The Sixth Assessment Report(AR6)





**Project Demo** 

Global Cooperation



### Summary



#### **Strengthen policy support for CCUS**

- Incorporate CCUS into the mid- and long-term technological development plan;
- Incorporate CCUS into carbon pricing mechanisms (e.g. the carbon markets);
- Explore subsidy policies for CO<sub>2</sub> storage and utilization (referring to the US 45Q);
- Introduce low-emission standards for large industrial sources (e.g. steel, cement, coal chemical industry)

# Promote investment in CCUS key technologies R&D

- Promote research on low-cost and low-energy penalty 2<sup>nd</sup> and 3<sup>nd</sup> capture technology;
- Promote CO<sub>2</sub> transport pipeline network, industrial CCUS, and offshore storage;
- Explore early opportunities for BECCS in China (e.g. bioenergy and coal co-firing power plant)
- Research the basic technologies to support CCUS project demonstration (e.g. storage potential, source-sink matching)

### Summary



#### Explore new commercial mode to reduce CCUS costs

- Design business model for the full-chain CCUS project demonstration;
- Develop more CCUS hubs by accelerating integration and demonstration;
- Transform a joint venture into a private capital dominated commercial mode.

# Actively develop international cooperation and knowledge sharing

- Create a CCUS knowledge system and shorten the R&D cycle by knowledge sharing;
- Initiate a CCUS multilateral cooperation mechanism and strengthen technology transfer and financial support;
- Deepen international multilateral cooperation under the framework of CSLF, CEM, MI, OGCI, IEA, etc.



# Thank you for your attention !

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