

# Status of and Perspectives on CCS in China

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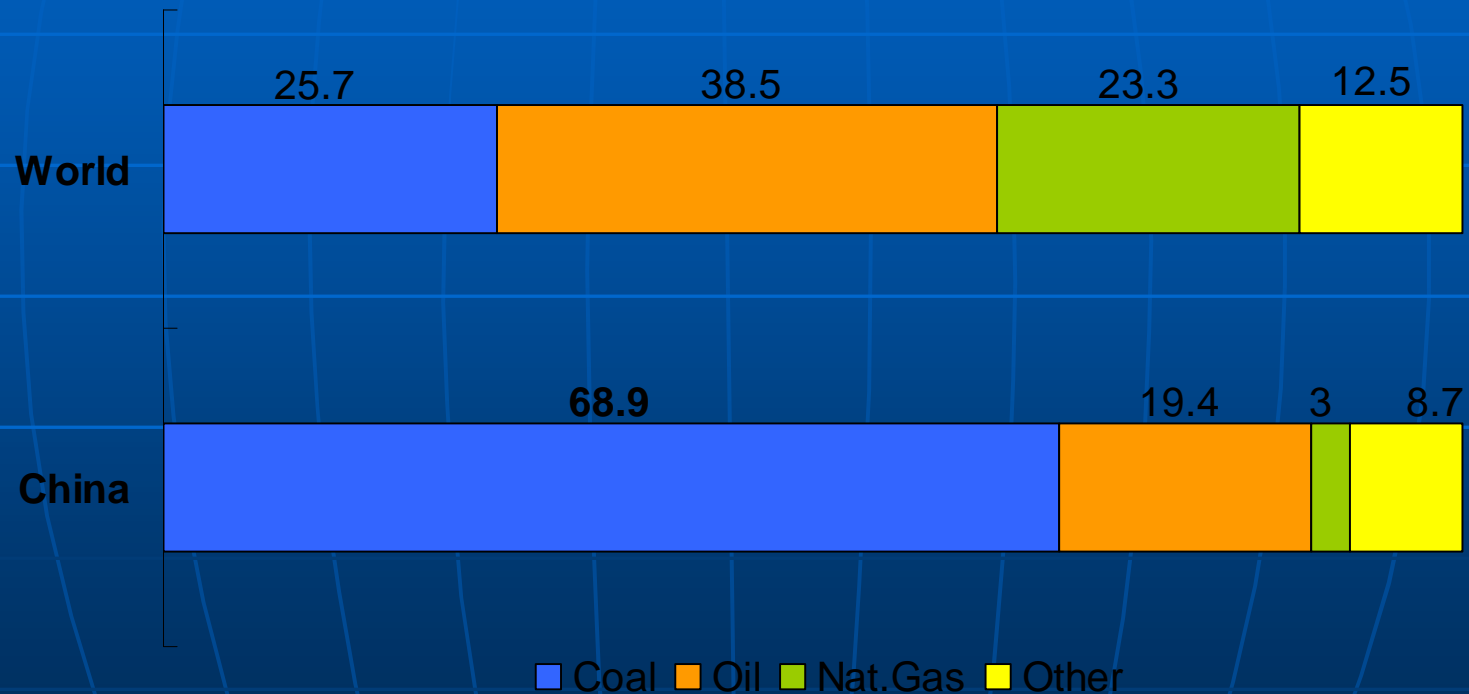
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# outline

- Energy Structure and Carbon Emission in China
- Very Preliminary Estimation of CO<sub>2</sub> Storage Potential in China
- Current Research and Project Activities
- Support from the Chinese Government
- China-EU-UK Cooperation on CCS
- Perspectives

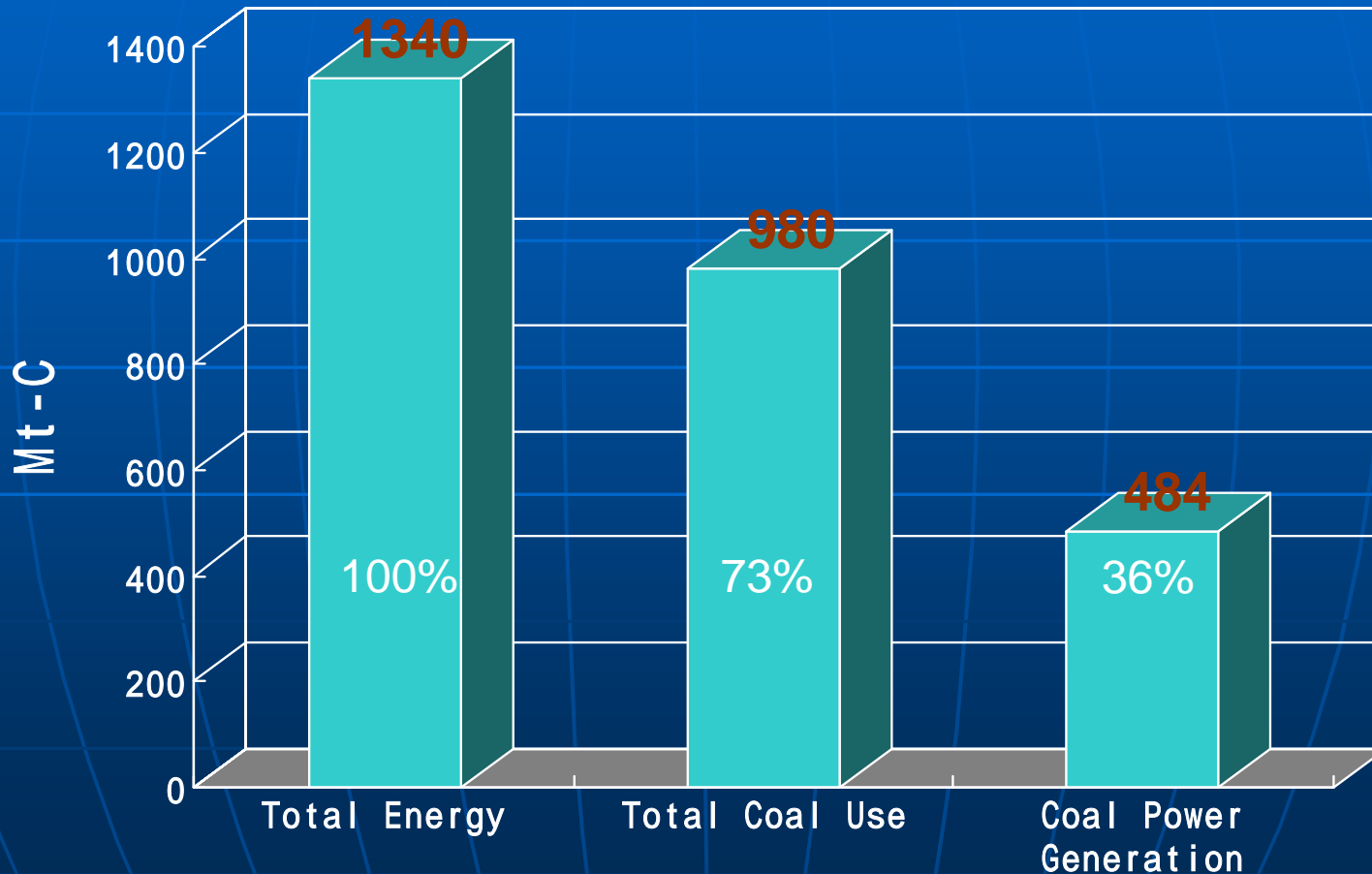
# Energy Structure: the World and China in 2005

## Percentage of Primary Energy



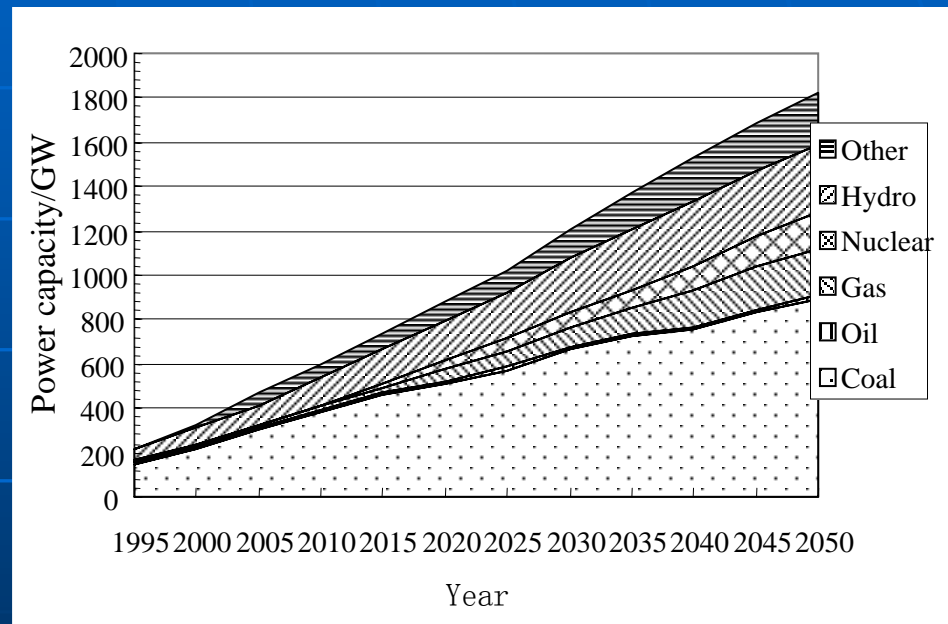
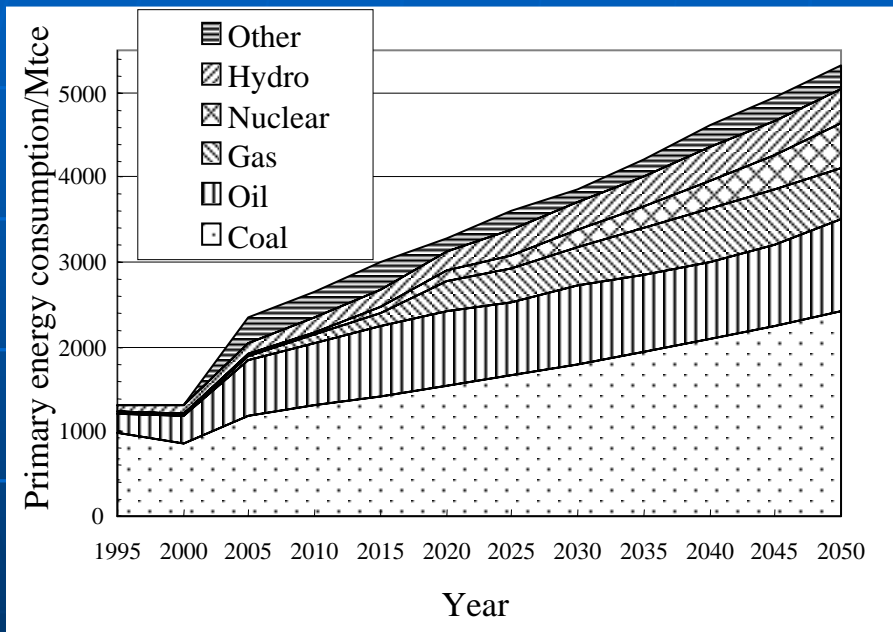
Source: Wu Zongxin, 2006

# Carbon Emissions in China (2004)



Source: Lu Xuedu, 2005

# A scenario generated from China MARKAL model



- The Share of coal in the total primary energy consumption is expected to decline, but still remain around 45-50% by 2050.
- The share of new and renewables in the total capacity of power generation is expected to increase, but coal-fired power plants will remain around 50% of the capacity by 2050.

# CO<sub>2</sub> storage potential in China

(very preliminary estimation)

- 46 oil & gas reservoirs, 7.2 billion t-CO<sub>2</sub>
- 68 unmineable coal beds with methane recovery, 12 billion t-CO<sub>2</sub>
- 24 saline aquifers, 1,435 billion t-CO<sub>2</sub>

# Current Research Activities

- Several academic institutes have done some research on carbon capture technologies, including
  - Pre-combustion technologies
  - Post-combustion technologies

# Current Project Activities

- **EOR (Enhanced Oil Recovery) projects** implemented in oil fields, such as Shengli, Zhongyuan, Jilin, Daqing, Jiangsu, etc.;
- **ECBM (Enhanced Coal Bed Methane Recovery) project** in Qinshui, Shanxi Province;
- Implementation of “**GreenGen Program**” by China Huaneng Group (CHNG)
- Demonstration Project of the **Yantai IGCC plant** for future CO<sub>2</sub> capture and storage and hydrogen production



# Support from the Government

- China is one of the initial members of Carbon Sequestration Leadership Forum, MOST is on behalf of China, engaging in the Forum actively.
- CCS was integrated into National Medium and Long-term Science and Technology Development Plan towards 2020 as leading-edge technology;
- In the 11th 5-Year Plan period (2006-2010), the National High Tech. Program (“863” Program) will support the development of CCS.

# China-EU-UK Cooperation (1)

- The Near Zero Emissions Coal (NZEC) Demonstration initiative, announced at the EU-China Summit in Sep. 2005, as part of the EU-China Partnership on Climate Change

*Further developed through following agreements*

# China-EU-UK Cooperation (2)

- China-UK MoU on near-zero emissions coal technology through CCS (phase 1) signed in December 2005;
- China-EC MoU signed in February 2006;
- Overall Goals for China-EU-UK NZEC/CCS Cooperation:
  - (1) assess the potential for near-zero emissions coal use through CCS in China;
  - (2) Develop capacity, expertise and knowledge in CSS in China;
  - (3) Develop and demonstrate advanced near-zero emissions coal technology through CCS in China and EU by 2020

# China-EU-UK Cooperation (3)

- China-UK MoU cooperation (2006-2008) covers:
  - 1) Develop knowledge & expertise in CCS;
  - 2) Assessment of CCS potential in China;
  - 3) Identify opportunities for demonstration and deployment in China;
  - 4) Review costs & economics of CCS in China;
  - 5) Options for financing R&D.
- UK will support with £3.5 million.

# China-EU-UK Cooperation (4)

- China-EC MoU defines a 3-phase cooperation:

Phase 1: Exploring the options for NZEC technology through CCS in China (to be completed by 2008);

Phase 2: Defining and designing a demonstration project; and

Phase 3: Construction and Operation of a demonstration project.

# China-EU-UK Cooperation (5)

- COACH (Cooperation Action within CCS China-EU) under EU/FP6
  - Target: Prepare for demonstration of near-zero emissions coal technology through CCS in China.
  - Partners: Totally 20 partners, 8 Chinese.
  - Work Packages:
    - **WP1**: knowledge sharing & capacity building
    - **WP2 & WP3**: identification of appropriate technology of CO<sub>2</sub> capture & storage and reliable geological storage capabilities
    - **WP4**: recommendations and guidelines for implementation
  - The kick-off meeting was held in Nov., 2006

# China-EU-UK Cooperation (6)

- International Workshop on Near Zero Emissions Coal-power Generation with CCS in China
  - Held in Beijing by MOST of China, DEFRA and DTI of UK and EC, 4-5 July 2006;
  - More than 80 international participants and 100 Chinese participants;
  - Overall objective: to define, steer and develop work being taken forward under the first phase of the NZEC Demonstration initiative; in details:
    - (1) Update on the status and development of CCS initiatives in China and internationally;
    - (2) Review the status and progress of current CCS activity in China and in the world;
    - (3) Facilitate and strengthen links between Chinese and the international CCS community;
    - (4) Generate a 'road map' for assessing the potential of CCS in China;
    - (5) Identify key actions and milestones for development and deployment of CCS technologies in China.

# Perspectives

- China looks CCS as one of the promising technological options with significant potential for GHGs emission reduction in the future.
- As a result, even without quantified emission limitation under KP, China is willing to join the efforts of international community on the development of CCS.
- In the next 5 years, China will focus on improving its energy efficiency, these efforts will contribute to greatly decreasing the growth of GHGs emission in China.



# Some Perspectives on CCS (Cont.)

- The Chinese Government will support the research of CCS in China, and expect Chinese CCS technology development roadmap to be planned in line with China's energy structure, e.g., to be combined with R&D of clean coal technology, because coal dominates Chinese energy supply in future.
- However, in near future, the scope and scale of CCS activities in China will mainly depend on such aid as fund and technologies from the international community.

# Some Perspectives on CCS (Cont.)

- China believes that international mechanisms are important to develop and demonstrate CCS technology and these mechanisms should be able to provide sufficient financial support to CCS activities in developing countries and should be helpful for technology transfer.
- China will continue to seek more CCS cooperation opportunities with other partners, which are funded by foreign governments and international organizations.

# Some Perspectives on CCS (Cont.)

- In near future, China will pay special attention on
  - ✓ relevant capacity building issues, such as information sharing, exchange of professionals, and introduction of measures, tools and models, etc.,
  - ✓ the areas that can bring direct economic returns, for example, EOR.
  - ✓ supporting the implementation of the Nation's key energy policies, such as enhanced coal bed methane (ECBM) exploitation and recovery with CCS.

**Thank you!**

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