

Technology Development for China: Energy and Climate Change

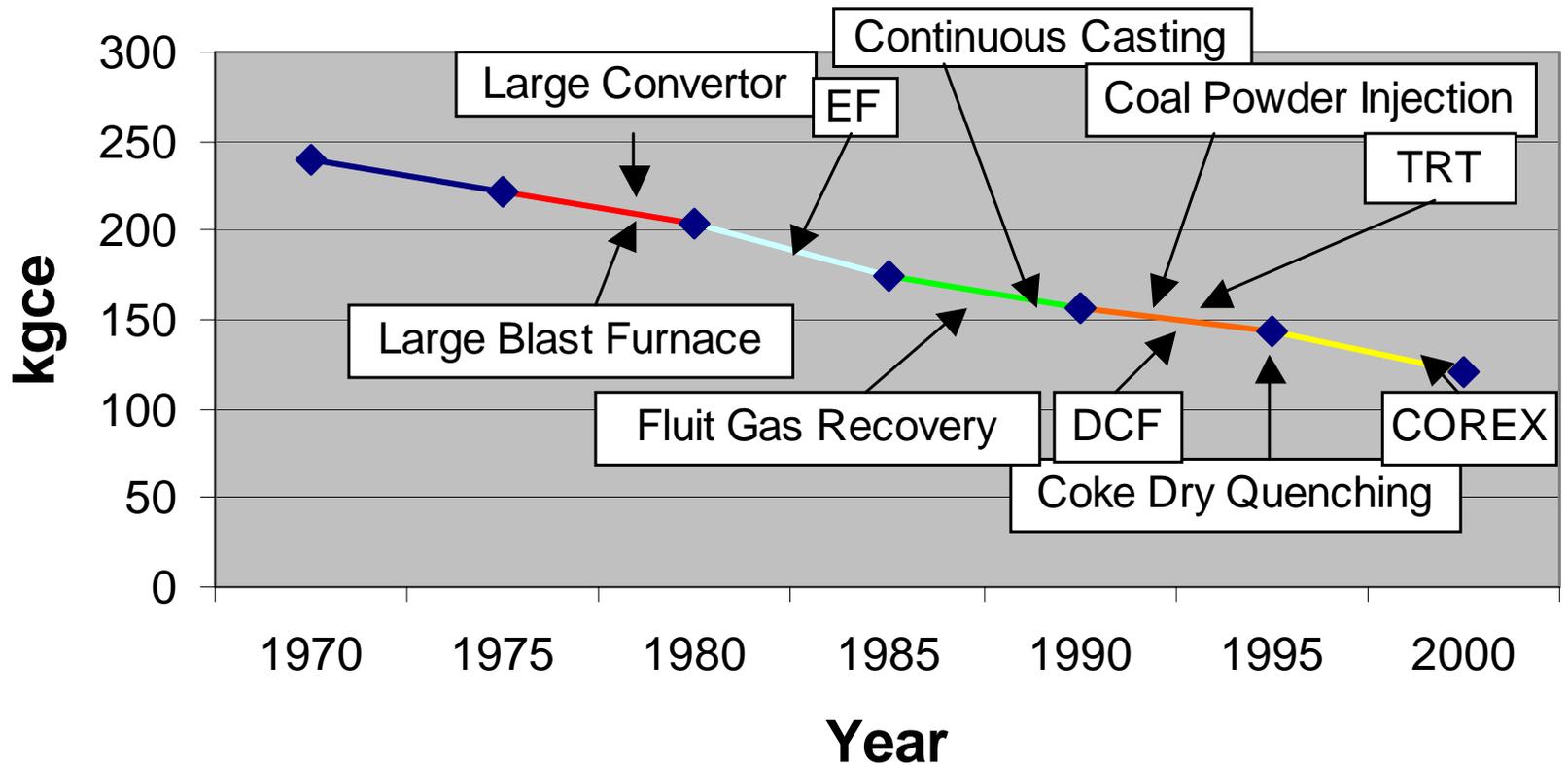
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GTSP meeting May 24, 2005, PNNL

Presentation content:

- Technology progress in China
- National Program for Technology R&D
- Role for key technologies
- Suggestion for Technology Progress

Unit Energy Use in Steel Making Industry



Power Generation Technology Progress

Super critical units: started from 1996, by now nearly 30 units. Domestic units of 600MW under demonstration. 1000MW units under construction.

Ultra-Super critical units: 4 units each for 1000MW under construction

Yantai IGCC Project: 300MW, will be finished by 2006

NGCC Units: 6*400MW under construction

Renewable energy

Wind Power: 600kW units could be produced in China, now is working on 1200 to 1500kW units. Planned to have capacity 20GW by 2020. An offshore wind farm under planning.

Biomass power generation: domestic technology available

Solar energy: need more effort

National program: China Agenda 21

Chapter 13: Sustainable Energy Production and Consumption

Programme Areas:

- A. Comprehensive Energy Planning and Management
- B. Improving Energy Efficiency and Energy Conservation
- C. Disseminating Less Polluting Coal Mining and Clean Coal Technologies
- D. Development of New and Renewable Energy Resources

The Priority Programme for China's Agenda 21(Frist Version)

Priority 4 Clear Energy and Transportation

Including clean coal technologies, increase of energy efficiency, utilization of renewable energy sources, modern transport planning and a pilot light rail, etc.

- 4-1 Construction of Integrated Gasification Combined Cycle Demonstration Power Plant
- 4-2 Construction of 150 MWe Pressurized Fluidized Bed Combustion Combined Cycle Demonstration Power Plant
- 4-3 Construction of Nuclear Heating Plant and Improvement of Safety Capacity
- 4-4 Emission Control, Energy Economy and Improvement of Safety for Automotive Products
- 4-5 Development, utilization and demonstration of renewable energy A. Solar Thermal and Photovoltaic Power Utilization B.The Development of A Large Size Wind Turbine Generator C.Exploitation, Utilization and Demonstration Projects of Biomass Energy
- 4-6 Modern Transport Planning and Management and a Pilot Light Rail Project

The Priority Programme for China's Agenda 21 (Revised and Expanded Version)

Priority 4 - Clean Energy and Transportation

- 4 - 7 Efficiency Improvement and Pollution Control of Medium-small Sized Boilers
- 4 - 8 The Exploitation, Development and Utilisation of Coal Bed Methane (CBM) Resources in China
- 4 - 9 China Green Lights Programme

National Program: 863 High Technology Development Plan

The National High Technology Research and Development Program (863 Program) was launched in March 1986 with the aim of enhancing China's international competitiveness and improving China's overall capability of R&D in high technology. The Program covers 20 subject topics selected from eight priority areas: Biotechnology, Information, Automation, Energy, Advanced Materials, Marine, Space and Laser. The first six areas are managed by the Ministry of Science and Technology (MOST) of the People's Republic of China. In the program, there are several key energy technologies.

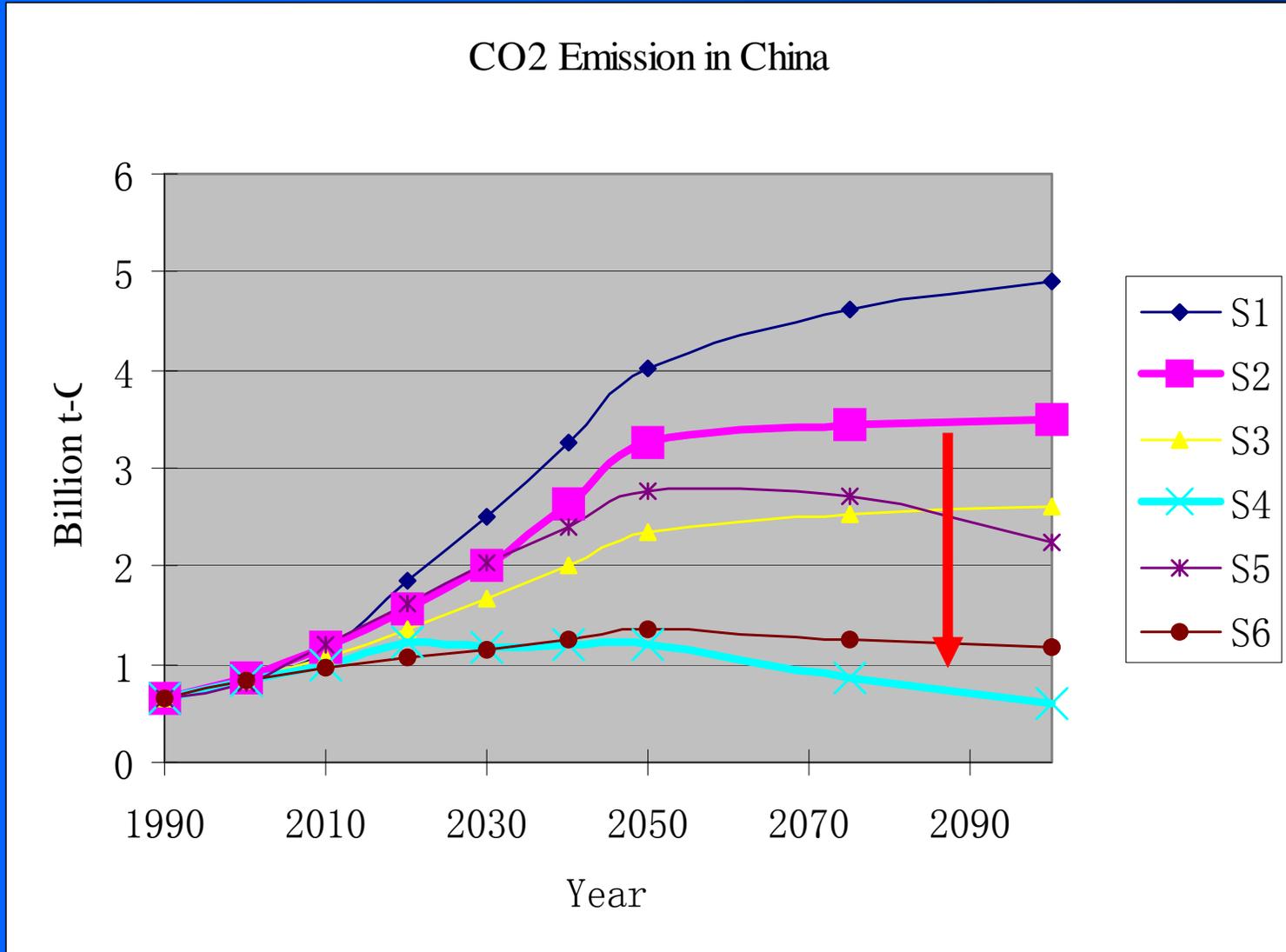
National Program: 973 High Technology Development Plan

The National Basic Research Program (also called 973 Program) is China's on-going national keystone basic research program, which was approved by the Chinese government in June 1997 and is organized and implemented by the Ministry of Science and Technology. The 973 Program is created on the basis of existing research activities and deployments made by the National Nature Science Foundation and major dedicated pre-studies, to organize and implement basic research to meet the nation's major strategic needs.

National Program: Key Energy Technology Development Plan by NDRC

Together with Ministry of Science and Technology (MOST), National Development and Reform Commission published Technology Development Priority Guidance for recent years. This guidance was used for investment planning and project approval. This guidance work well for nearly market based technology development. There are chapters for advanced energy, mainly including fuel cell, hydrogen storage and transport, new and renewable energy, high efficient coal production, oil exploitation technology, hydrogen adding to oil technology, coal bed methane technology, high efficiency and low emission coal fired power generation system, large scale super critical units and ultra-super critical units for power generation, nuclear power and fuel technology, long-distance high pressure natural gas pipeline, long-distance power transmit line, semi-conduct light, natural gas utilization technology.

Contribution of technology Change



A group of Key technologies is very crucial for low emission future

- Modern renewable energy production (Offshore wind, solar energy etc.)
- Advanced nuclear power generation
- Fuel cell/Hydrogen/Hybrid vehicle
- **IGCC/Advanced clean coal technologies**
- Advanced gas turbine

- Unconventional natural gas and crude oil production technologies
- Synfuel production technology
- Carbon capture

Challenge faced: recommendation

- The technology change should be promoted right now
- Much more domestic investment for R&D is required
- International collaboration is very important:
government effort, commercial based technology transfer, research collaboration: take ITER project as example
- More market based options