

華山会・上海市日本研究交流協会・上海交通大学共催Symposium March 27, 2003

Japan – China Cooperation in Environmental Field

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Environmental Issues in China

1) Economic Growth, Environmental Protection and Stable Energy Supply

Economic Growth will be adversely affected by pollution (World Bank Report &c.)

2) To cope with 3 environmental issues simultaneously

Industrial Pollution, Urban Pollution and Global Issues (Climate Change)

Japan – China Cooperation in the field of Environmental Protection

- Resource (human, capital and technology)
Transfer through
ODA, OOF, Local G. and Private Sectors
- For Industrial Pollution → SO_x, Soot
- For Urban Pollution → NO_x, Waste M.
- For Climate Change → CO₂
→ Capacity Building

Ideal Cooperation between two countries

- Projects that contribute both
 - 1) To Reduce SO_x Emissions
 - 2) To limit CO₂ Emissions



Fuel switching to natural gas is the best way

However, two points to be considered

Cost and Availability

How to cope with the situation?

- Short-term

Improving Energy Efficiency to cope with Industrial Pollution and Climate Change

Three-way converter of automobile for NO_x

Bilateral cooperation of waste management

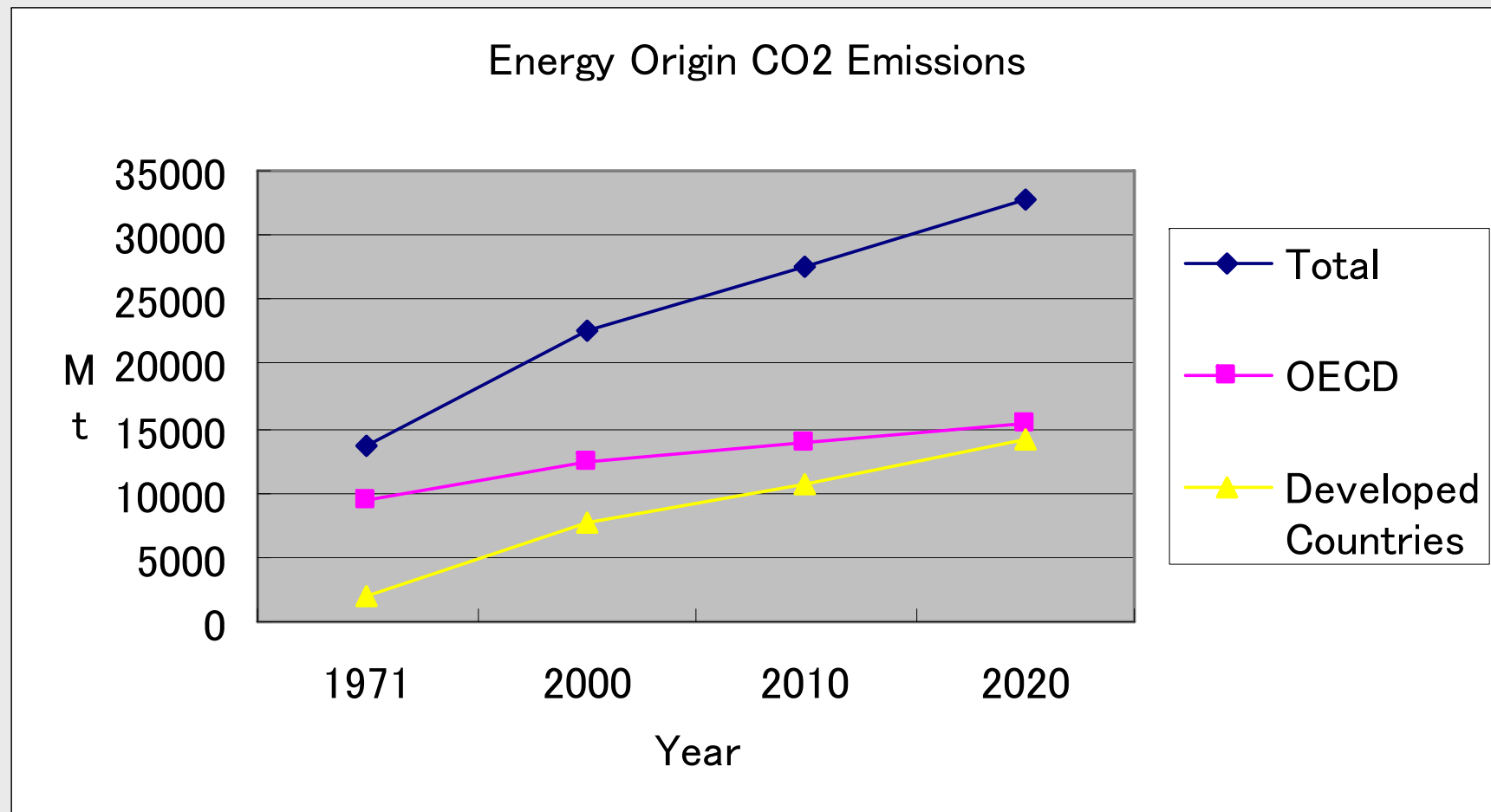
- Long-term

Fuel switching

Renewable Energy

Importance of Developing Countries

Climate Change



Source IEA World Energy Outlook 2002

China's Energy-origin CO2 Emissions

Second biggest emitter

	2000	2010	2020
World Total	22,639 Mt	27,453 Mt	32,728 Mt
China	3,052	4,155	5,393
Ratio	13.5%	15.1%	16.5%

Source, IEA World Energy Outlook 2002

Importance of Clean Development Mechanism (CDM)

- What is CDM
- Only mechanism Developed and Developing Countries can cooperate to cope with Climate Change
- To enhance Technology Transfer
- Restrictions
 - No nuclear Energy
 - No diversion of ODA for CDM projects
(→ODA for Capacity building)

China and International Cooperation on CDM

- World Bank/GTZ
- Asian Development Bank
- Canada
- The Netherlands
- GEF
- Keio University Project

Characteristics of our Project

- To find out the most cost effective projects
- To find out the most feasible projects
- Based on precise and detailed data



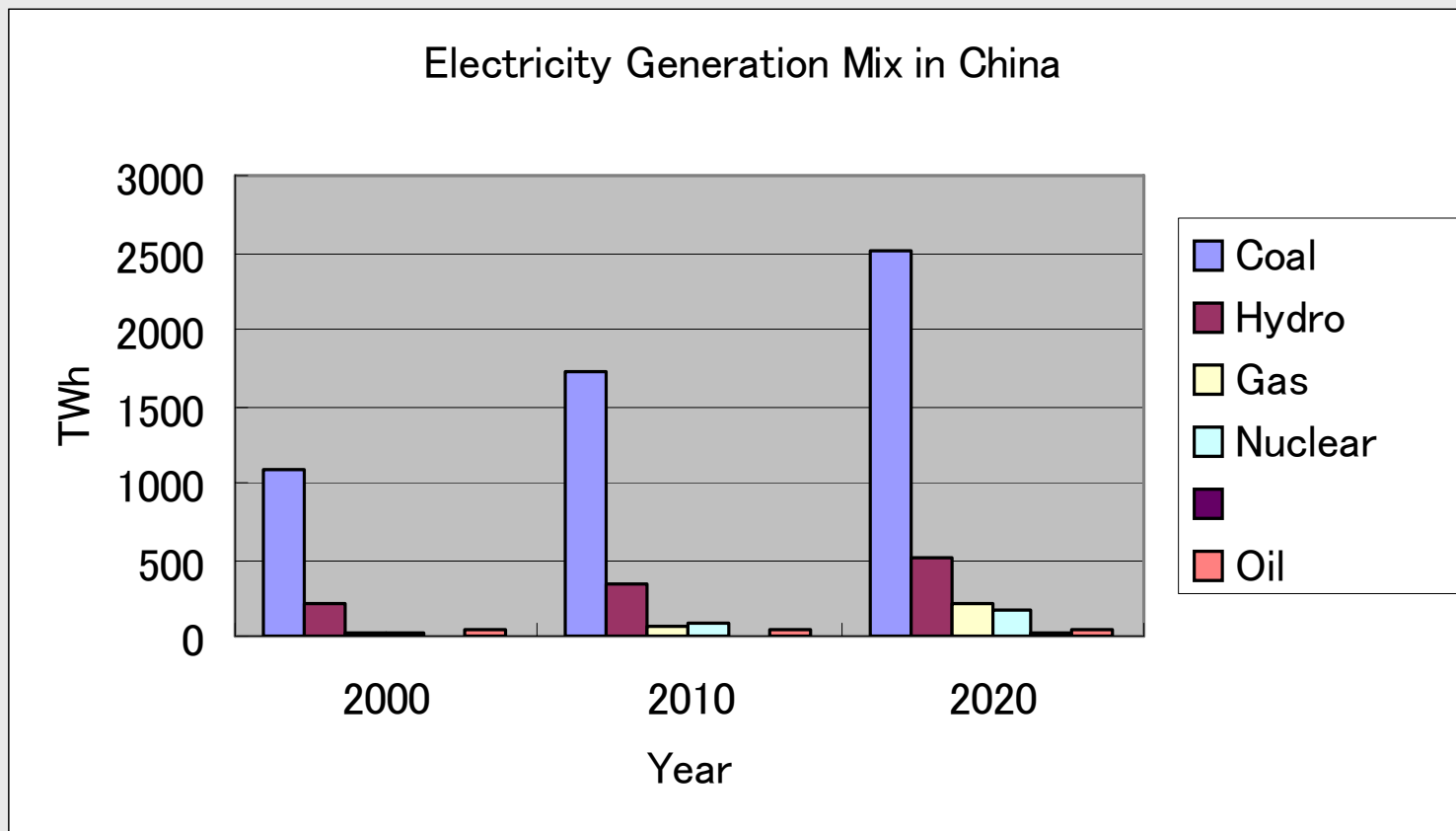
- 1) Power Plant (energy efficiency improvement)
- 2) Iron and Steel
- 3) Paper and Pulp
- 4) Cement
- 5) Chemical

Methodology

- To estimate CDM potential (reduction of CO₂ emission)
- To estimate reduction cost per ton of CO₂

Example: CDM project in Power Plant

Coal remains predominant in China's power generation



Source, IEA World Energy Outlook 2002

Classify into three categories

- 50 MW units → Scrap & build
- 100/200 MW units → Modification
- 300MW and over → No project
- 66 out of 159 units in the Northern China Region were selected as having CDM potential
- Select model plants
- Then expand to whole China area

Selection of Model Plants

	Unit Capacity	Model Plant
Group1 Scrap & Build option	50MW	Shanxi, Taiyuan No.2 Electric & Thermal Power Station 50MW * 4
Group2 Improvement of thermal efficiency option	100MW	Inner Mongolia, Haibowan Electric Power Station 100MW*2
	200MW	Inner Mongolia, Huaneng Fengzhen Electric & Thermal Power Station 200MW*6

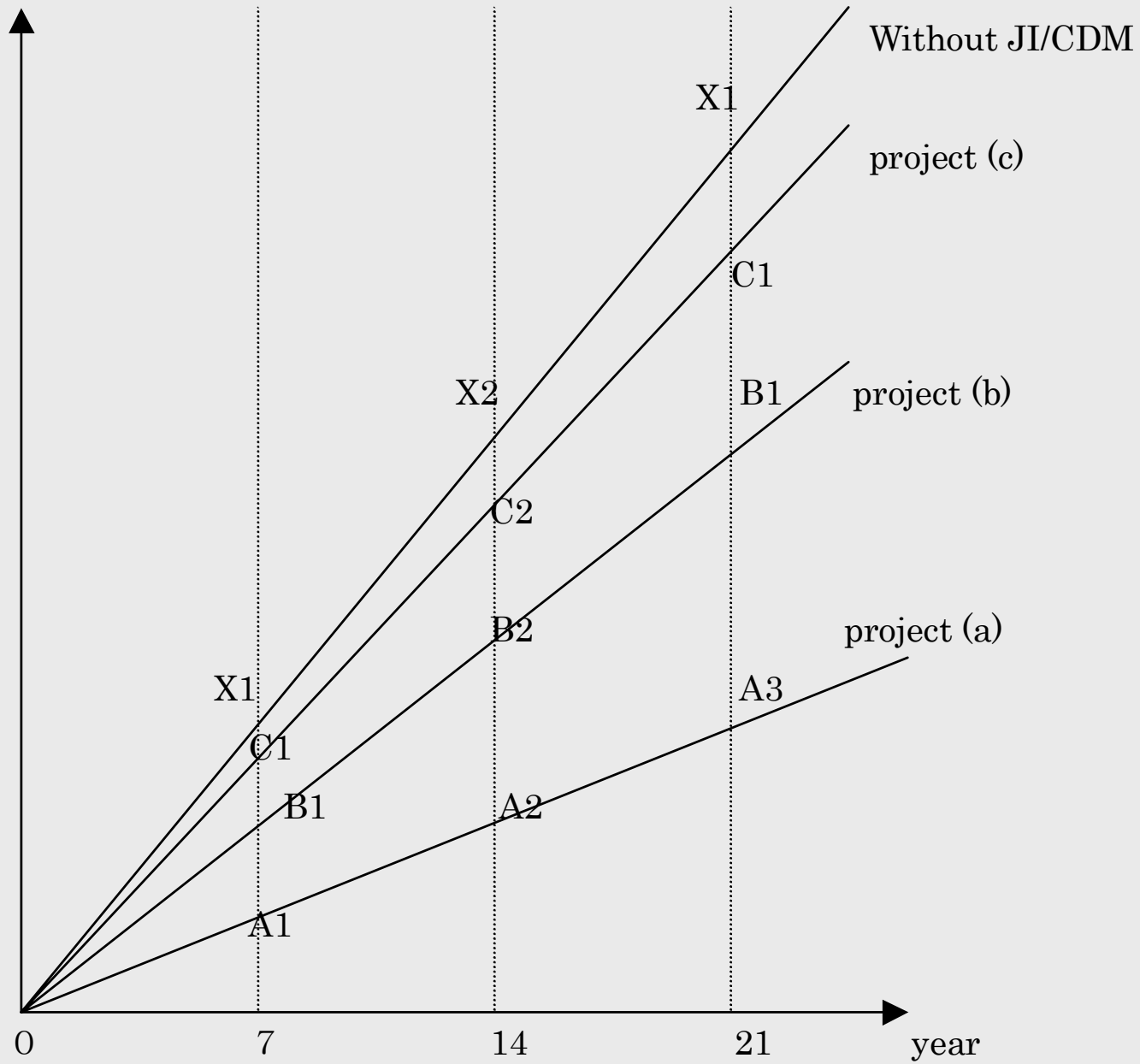
Estimation of CO2 reduction

- Estimation of baseline emission
- Calculation of thermal efficiency improvement
- Calculation of CO2 emission reduction potential in Northern China Region (Hebei, Shangxi and Inner Mongolia)
- Estimation of China's total emission reduction potential for power plant CDM project

Summary of CDM potential and cost in Northern China Region

	50MW	100MW	200MW	Total
Total capacity of the targeted units (MW)	1,000	2,000	5,200	8,200
CO₂ emission reduction (1000t/y)	2,142	524	1,270	3,936
Total investment (million \$)	131.5	175.8	397.8	705.1

Figure2 Cumulative CO2 emission reduction of each project



CO₂ reduction cost by CDM

- CO₂ reduction cost, expressed in terms of CDM project cost per unit reduction of CO₂, can be calculated as follows:

$$\frac{\left[\sum_{i=1}^n \frac{(EC_i - EB_i)}{(1+r)^i} + I_0 \right]}{\sum_{i=1}^n Y_i}$$

- where Y_i is CO₂ reduction in the year i .
- where $(EC_i - EB_i)$ is the saved fuel cost in the year i .

Cost comparison (coal and gas)

Tentative, do not quote

- Energy efficiency improvement projects

¥913 – ¥3,109 (project period 7 years)

¥275 – ¥1,399 (- do- 14 years)

- Fuel switching project to Natural Gas

¥6,797 (project period 7 years)

¥4,569 (- do - 14 years)

- Market Price

CDM potential in China

Sectors	Reduction Potential Mt annually
Power Plant	28
Iron & Steel	6
Paper & Pulp	0.4 – 1.2
Cement	14
Chemical	9

Tentative, do not quote

How to promote CDM projects

- Capacity building
Sustainable Development Partnership
Type 2
Asia Capacity Building Initiative by Japan
through institutional streamlining, dissemination of
knowledge and expertise, national strategies etc.
- Find out prospective investors

Conclusion

- Competition among developed countries
- Competition among developing countries



- To materialize “Win – Win” situation