

Economic Aspects of the Global
Warming and Climate Change Policy
with special reference to Japan

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Outline of Presentation

- Economics of the global warming
- Climate change policy debate in Japan
- Environmental economic(win-win) strategy towards low-carbon society in Japan and East Asian Region

Recent developments in the economics of the global warming

- Stern review(2006)

Projected impacts of the global warming

Probability and possible consequences of GW

Cost of inaction and cost estimates

Scale and urgency of response

Growth, change and opportunity

- IPCC 4th assessment report(2007)

Possible consequences of GW: from Stern(2007)

- Collapse of Greenland ice-sheet and likely West Antarctica sheet;
- Likely increase in extreme events around the world (storms, floods, droughts etc.)
- Eventual sea-level rise likely to be more than ten metres, major threat of inundation of world's costal cities and low-lying areas (Bangladesh, Florida)
- Likely extinction of majority of earth's species

Costs of inaction and stabilisation targets:

from Stern(2007)

- Risks of and damages from more than 5° C increase point to maximum stabilisation target of 550ppm CO₂e
- Very simple aggregate modelling indicates damage from business as usual (BAU) in range of 5-20%, averaged over time, space and possible outcomes
- Bulk of these avoided if stabilise at less than 550ppm CO₂e
- Key assumptions concern ethical values (how do we value benefits to future generations?) and assumptions about potential risks
- Most reasonable assumptions on ethics and risks point to large damages

Cost estimates: from Stern(2007)

- Stern Review examined results from bottom-up (Ch 9) and top-down (Ch 10) studies: concluded that world could stabilise below 550ppm CO₂e for around 1% of global GDP
- Subsequent top-down analyses Edenhofer/IPCC, have indicated even lower figures
- So too have bottom-up: IEA and McKinsey
- Options for mitigation: McKinsey analysis examines approach of chapter 9 of Review in more detail

Growth, change and opportunity:

from Stern(2007)

- Strong mitigation costs around 1% p.a. worldwide
- Strong mitigation is fully consistent with the aspirations for growth and development in poor and rich countries. BAU is not.
- Competitiveness impacts can be reduced by acting together
- New markets will be created. Investment in low-carbon electricity sources could be over \$500bn a year by 2050
- Mitigation policy can also be designed to support other objectives:
 - energy - air quality, energy security and energy access
 - forestry - watershed protection, biodiversity, rural livelihoods

Messages from Stern review

- Global consensus for international climate regime
- Ambitious emission reduction targets+
- Carbon market ▪ ▪ ▪ international ETS
 - ①effectiveness
 - ②encourage the participation of developing countries
- Effectiveness, efficiency and equity
- Role of developed countries

Climate change policy debate in Japan

- Kyoto protocol ▪ ▪ ▪ COP3(1997) in Kyoto
- 6% reduction of GHG from 1990 level
- 6.4-7.8% increase from 1990 level
- How Japan can attain the target of Kyoto protocol ▪ ▪ ▪ Kyoto target achievement plan
- Voluntary approach or economic approach
- International climate regime beyond 2012

Politics and economics of low carbon society

- Cool earth 50 ▪ ▪ Bali(2007) ▪ ▪ Davos(2008)
- Toyako summit(2008)
- Developed countries vs developing countries
- Sustainable development
- Domestic win-win strategy
- Global/International win-win strategy

Domestic win-win strategy(1)

- Overcome the trade-off between economic development and environmental protection
- Factor4
- Porter hypothesis
- Environmental Fiscal Reform
- Japanese experience

Domestic win-win strategy(2)

- Price tag on carbon ▪ ▪ ▪ incentive
- + Eco-innovation ▪ ▪ ▪ policy mix
- Eco-manufacturing ▪ ▪ ▪ monozukuri
- Sustainable city-region ▪ ▪ ▪ machizukuri
- Sustainable competitiveness
- Creativity based on communication
and learning

Regional win-win strategy in East Asia

Climate change issue in East Asia

Japan : Negative impact

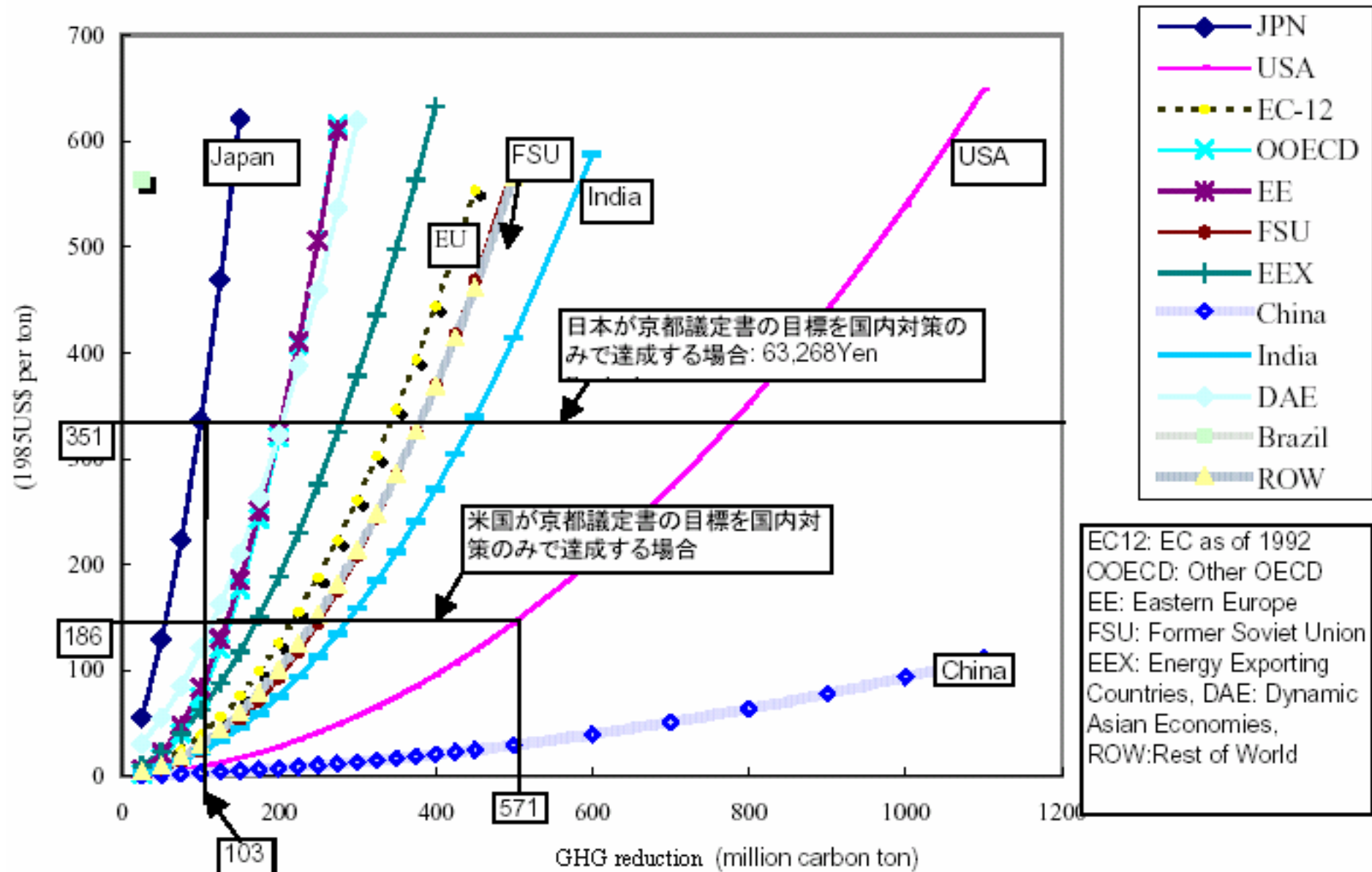
China : Urgent issue?

**Positive strategy for both China
and Japan · · · regional cooperation**

Rationale for Cooperation

- MAC of CO₂ in China and Japan
- Local pollution and environmental and health damage in China
- Domestic and regional optima
- Clean Development Mechanism
- Co-benefits (Ancillary benefits)

MAC of CO2 in China, Japan, etc.

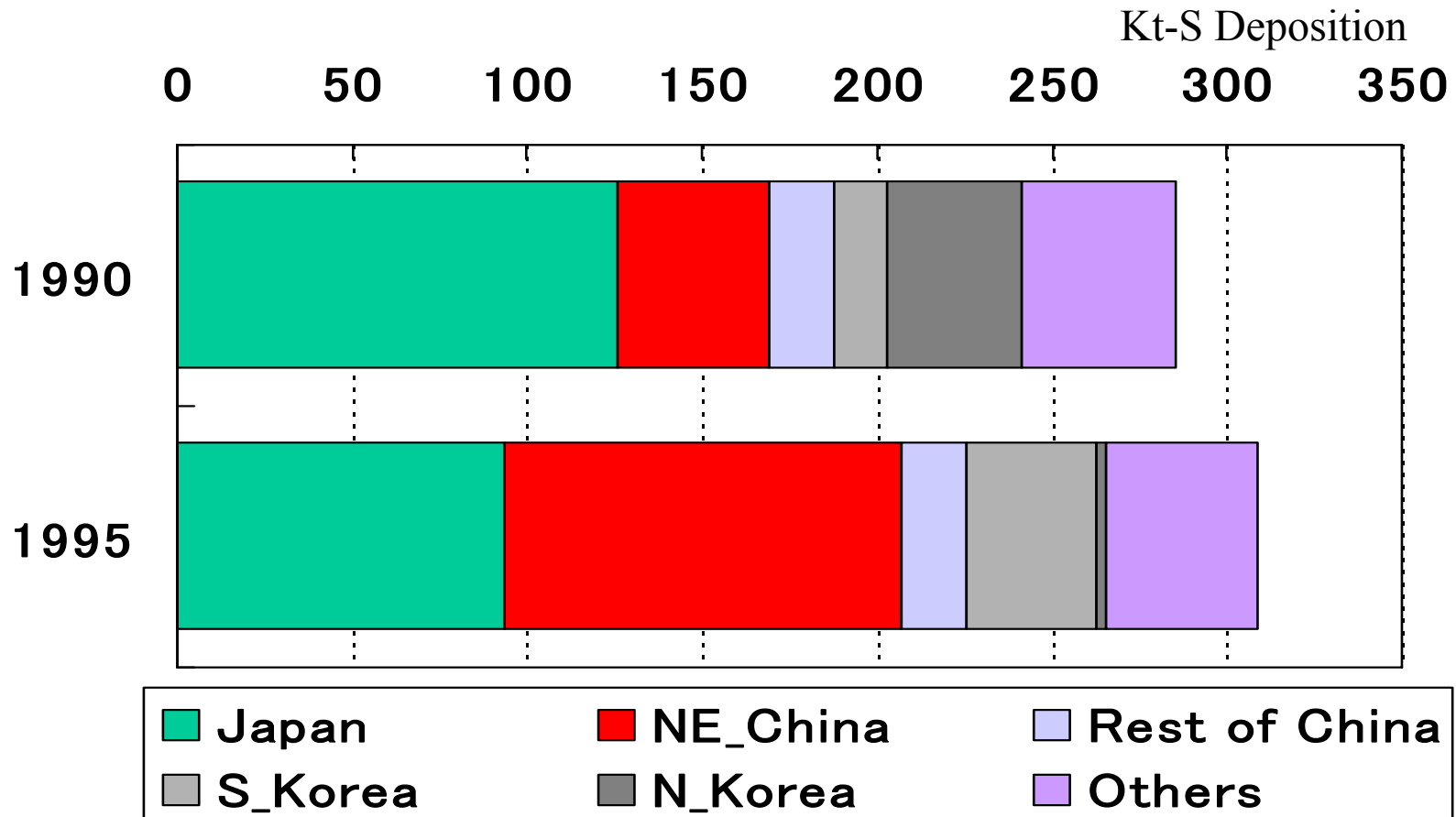


Total Damage Costs and Marginal Damage Costs in China

| | | Total Damage Costs | Marginal Damage Cost |
|----------------------|-----------------|---------------------------|-----------------------------|
| | | 1993 (mil.Yuan) | 1995 (\$-SO2) |
| Health | | 13,800 | 221.24 |
| Acid Rain | Forest | 10,600 | 128.26 |
| | Crops | 2,200 | |
| | Building | 3,200 | |

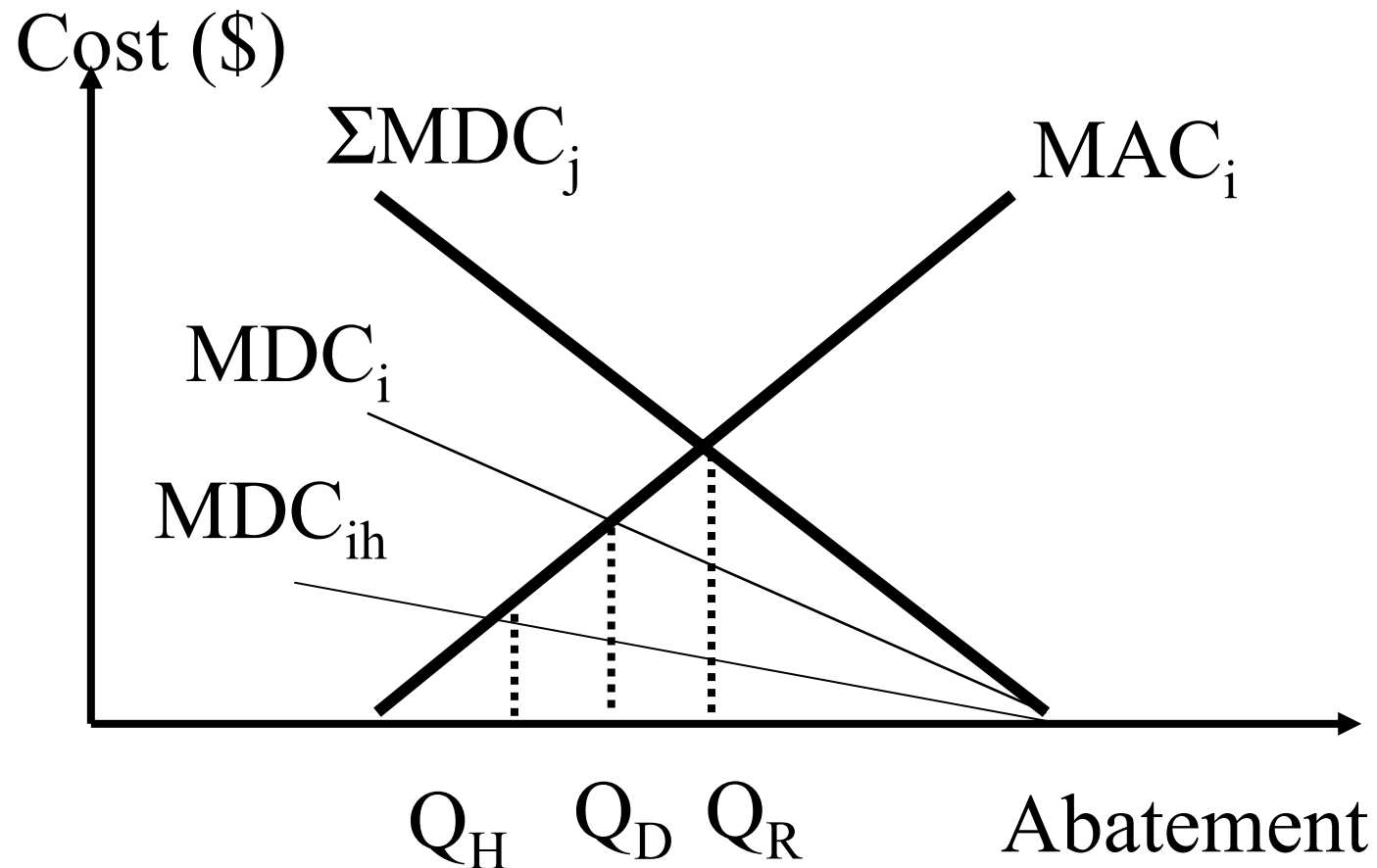
Nakata and Ueta (2003) "Sulfur Emissions Control in China," mimeo.

Sulfur Deposition in Japan Contributed by Source in 1990 and 1995



Nakata and Ueta (2003) "Sulfur Emissions Control in China," mimeo.

Regional Optimum / Domestic Optima



Nakata and Ueta (2003) "Sulfur Emissions Control in China," mimeo.

Regional Cooperative Approach

- **How to realize technology transfer through economic mechanism · · · CDM, carbon market**
- **Collaboration of CDM with other Domestic Measures for Sustainable Development**
- **Multi-level Environmental Governance for Sustainable Development**

