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# Environmental Governance and Economics for Sustainable Low Carbon Society in East Asia

Hokkaido University

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# Outline of Presentation

- Sustainable Development/Low Carbon Society
- Environmental Kuznets Curve
- Japanese experiences
- Regional cooperative approach/  
Environmental governance for SD

# Sustainable Development

- Most common definition of Sustainable Development: *"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* (Our Common Future, 1987)
- Development with ecological/environmental sustainability + economic and social sustainability

# Sustainable Development ( 2 )

- Economic Interpretation/definition of SD
- Dasgupta(2001, 2007)---Social Well-being/QOL
- Constituents and Determinants of QOL
- Productive Base · · · Criteria for SD
- Wealth · · · Capital Assets ( Man-made Capital, Human Capital, Natural Capital and Knowledge)
- Critical Natural Capital
- Inclusive Wealth and Institutions

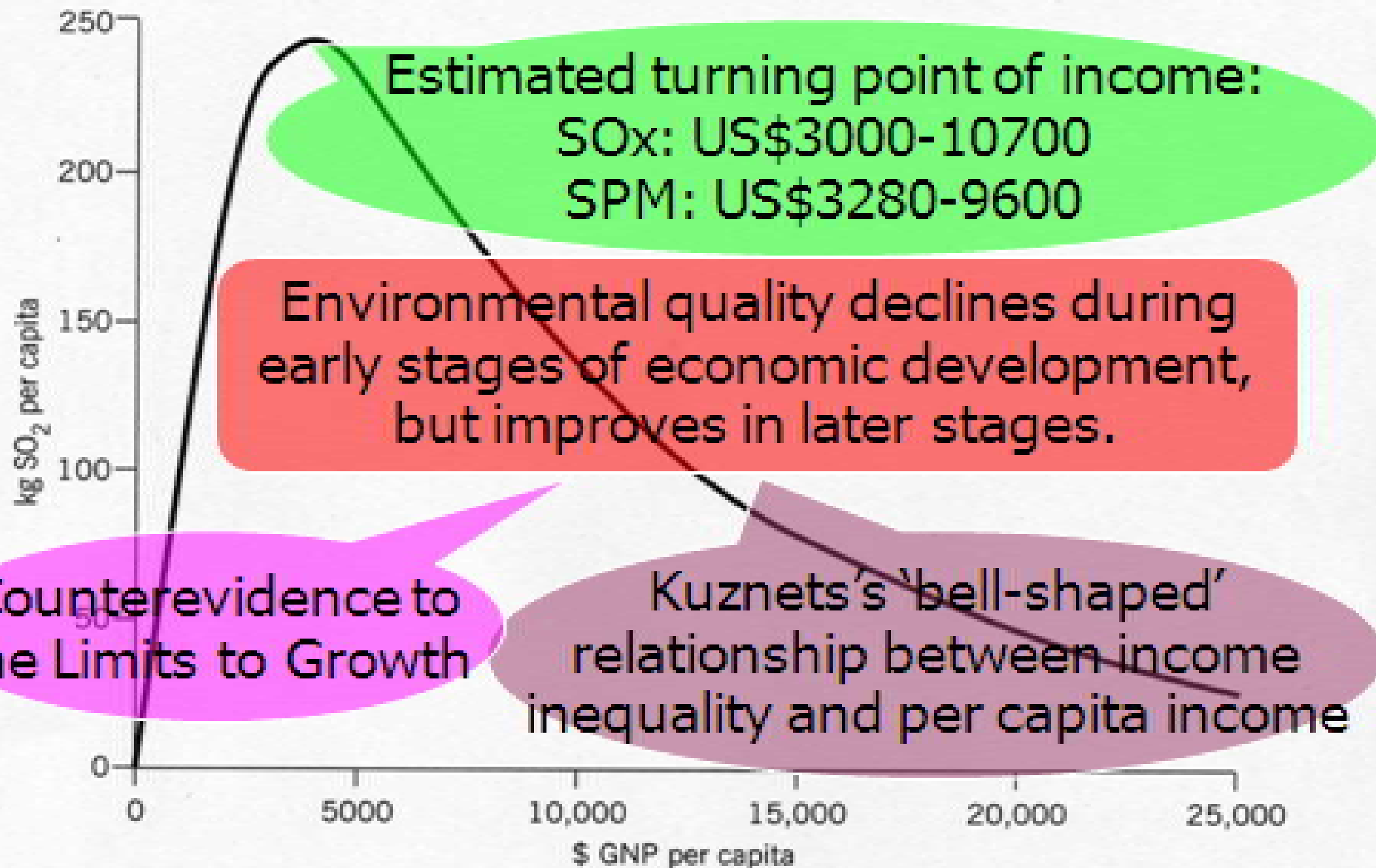
# Low Carbon Society

- Low carbon society is necessary to protect climate which is critical natural capital
- Low carbon society can be realized through ambitious reduction target and climate policy in developed country
- Low carbon society is a necessary condition for sustainable development/society, but not enough
- Global (developed countries' and developing countries') low carbon society

# Can we overcome the trade-off between environmental conservation and economic development

- Conventional wisdom · · · trade-off
- Internalization of external diseconomy
- Decoupling strategy
- Dematerialization
- Factor4/Factor10, Porter hypothesis
- Environmental fiscal reform/double dividend

# Env. Kuznets curve hypothesis

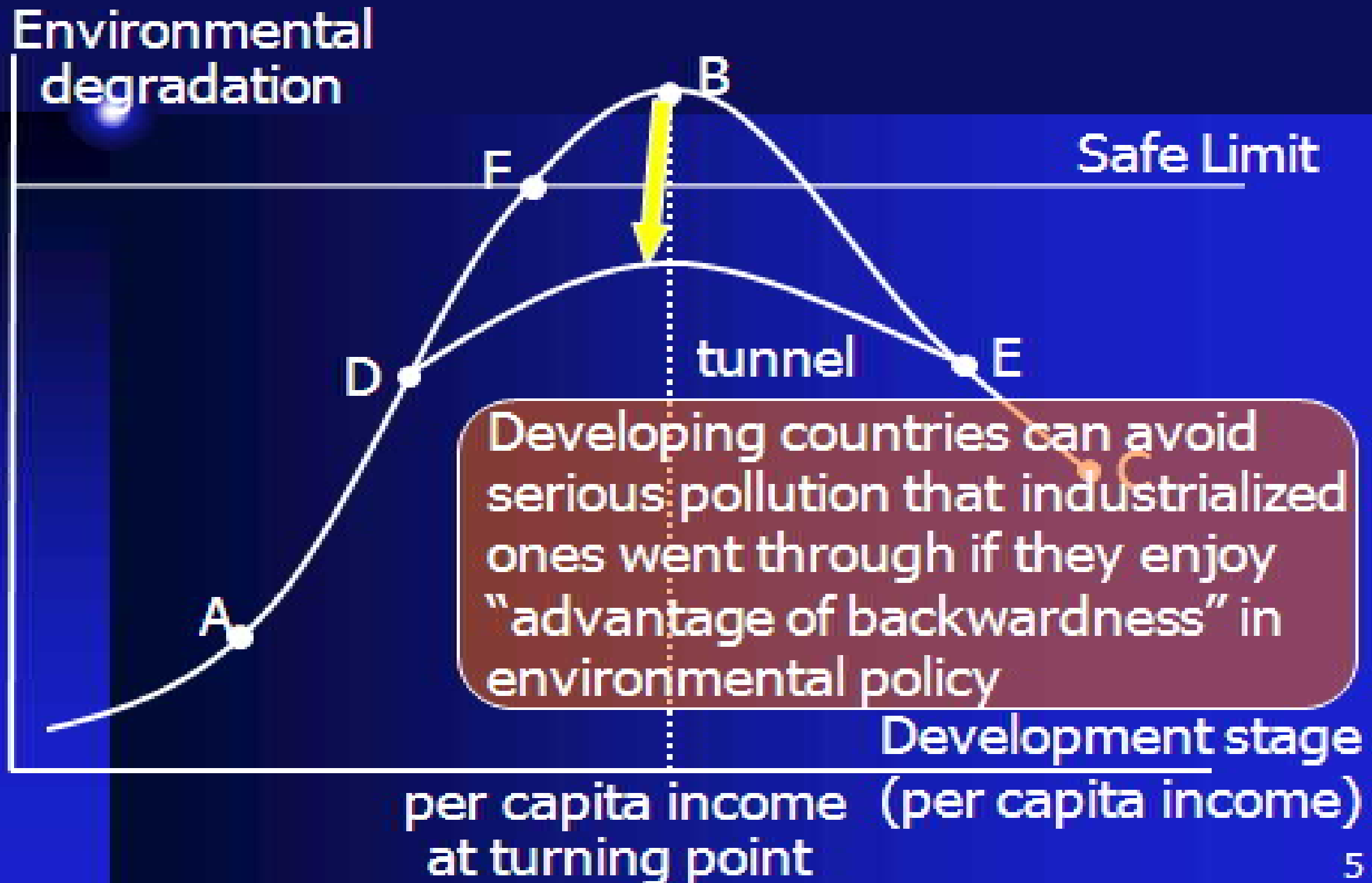




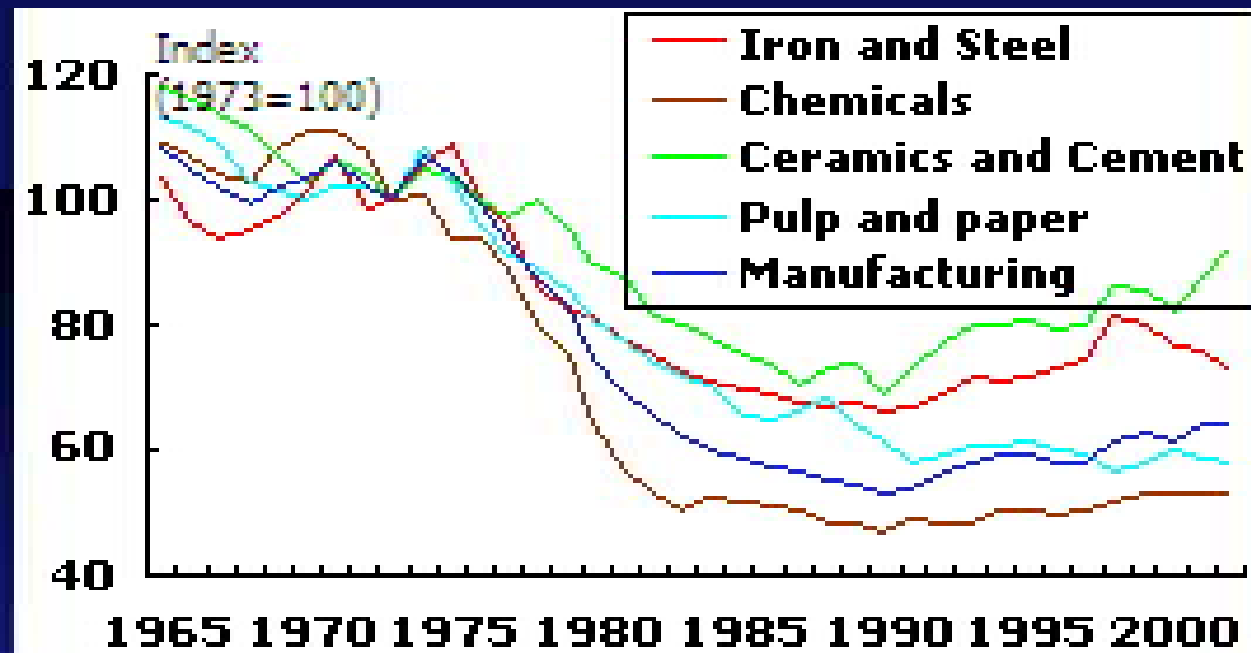
# Critiques to the E Kuznets Curve

- Econometric method to the EKC
- Range of environmental pollution and pollutants that EKC can explain
- Explanatory power of the factors environmental movement  
N-shaped curve
- Earth's resource base vs. indefinite economic growth(Arrow et al., 1995)

# Munashinge's Curve on "Tunnel Cut"

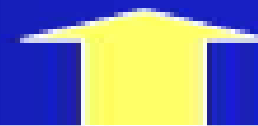


# Delink of Econ. Growth and Env

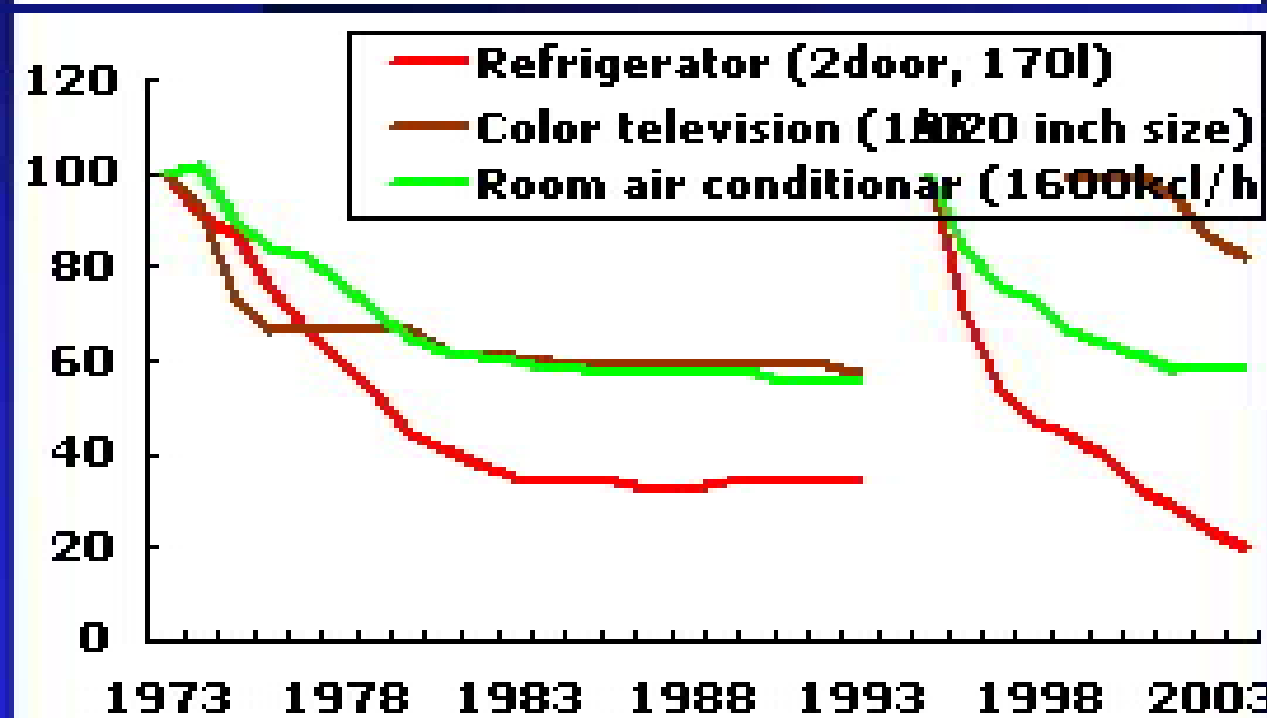


\* GDP in Japan grows to double during 1973-96

- Resource productivity (Energy productivity) became double



**Technological progress** induced by rise in energy price **and** **environmental regulation**

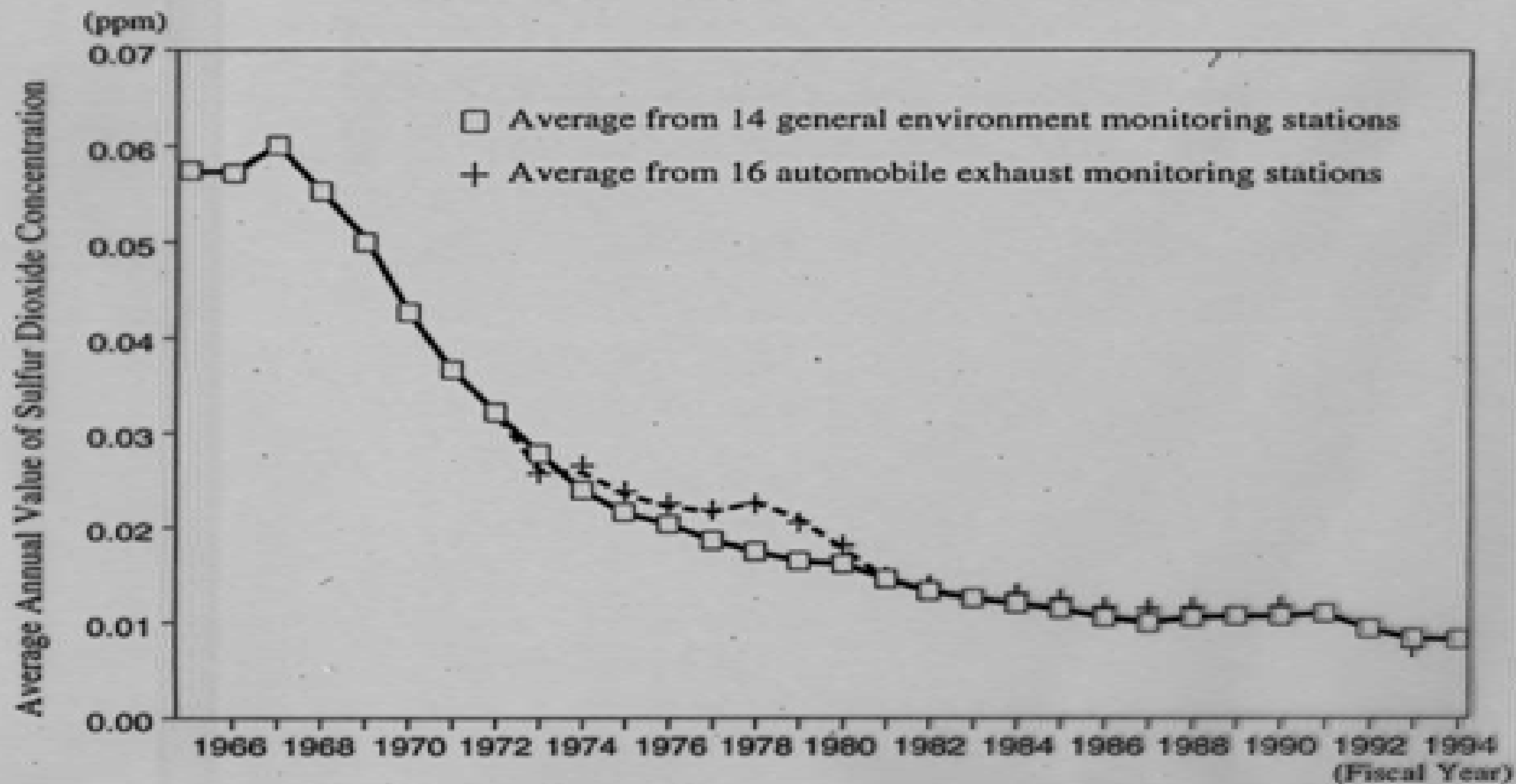


The above indicates energy efficiency in industrial sector, and the lower shows energy efficiency of electronic appliances in Japan.

# A Brief History on Kogai

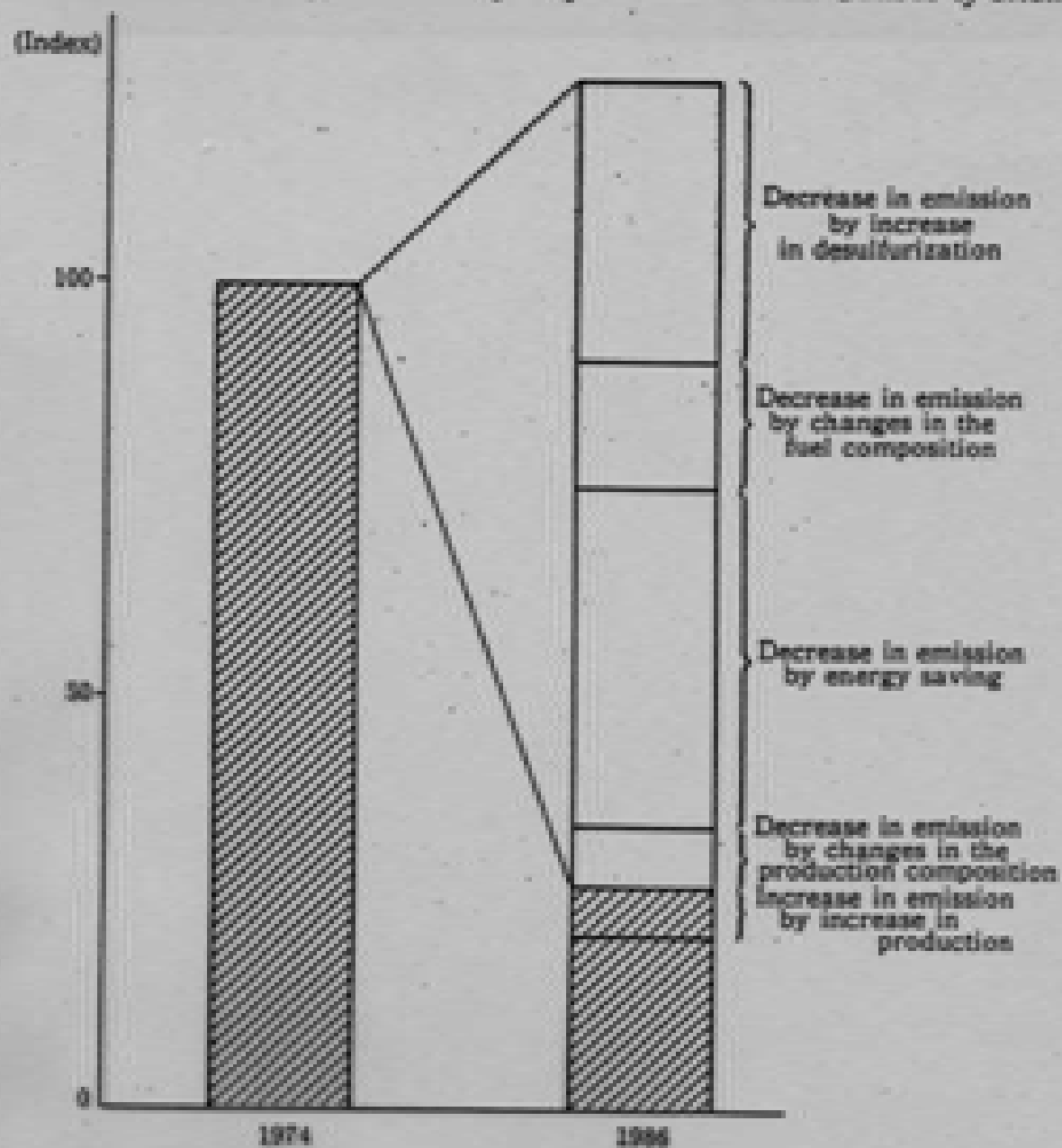
- Minamata mercury poisoning/disease(1956)
- Irreversibility/Anti-pollution movement
- Kogai litigation/court case
- Local initiative
  - pollution control agreement(1964)
  - environmental ordinance(1968)
- Pollution Diet(1970), Environmental Agency(1971)
- Victims of pollution-related health damage

**Figure 2-2 Changes in Average Annual Sulfur Dioxide Values**  
(average of data from continuously-monitoring stations)



Source: *Quality of the Environment in Japan (1996)*

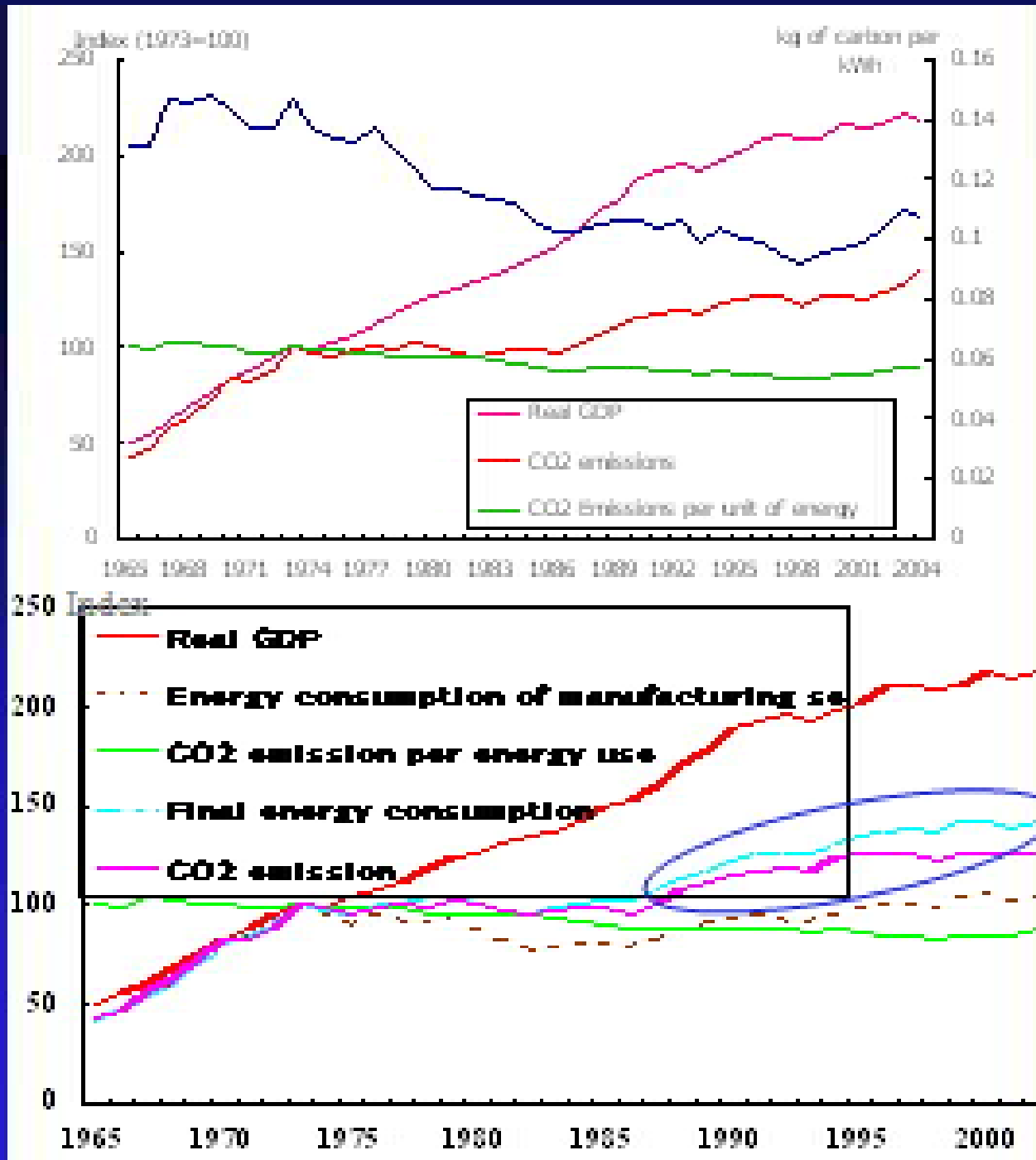
Figure 4 Analysis of Emission of Sulphur Oxides and Causes of Their Changes



Note: For the index, the emission of 1974 is set at 100.

Source: Environment Agency 1992: 75

# Relinkage of GDP and CO<sub>2</sub> Emission



\* Power generation companies have devoted efforts to raise efficiency to reduce CO<sub>2</sub> emission per unit

\* **Relink** the GDP and CO<sub>2</sub> emission after the year 1987 in Japan

The above shows per unit and total CO<sub>2</sub> emission in power sector in Japan and the lower shows the relationship between GDP and CO<sub>2</sub> emission in Japan

# Lessons and Implications

- Irreversibility/Paradigm shift---Pollution Diet(1970)
- Local initiative/court/movement . . .
- Comprehensive environmental policy . . . clear signal for market, organization and individuals
- Stringent target + regulation(ppp) + integrated policy (environmental and industrial policy)
- Environmental regulation, pricing (policy) and technological innovation
- Capacity development---learning capacity/ creativity of people and organization + institutions



# Seriousness and Features of Env. Disruption in East Asia

- Rapid industrialization and high economic growth(catch-up style of economic development)
- Pre-welfare state · · · public health issue
- Local, regional, and global env. issues
- Region as victim/polluter
- Economic and ecological interdependence

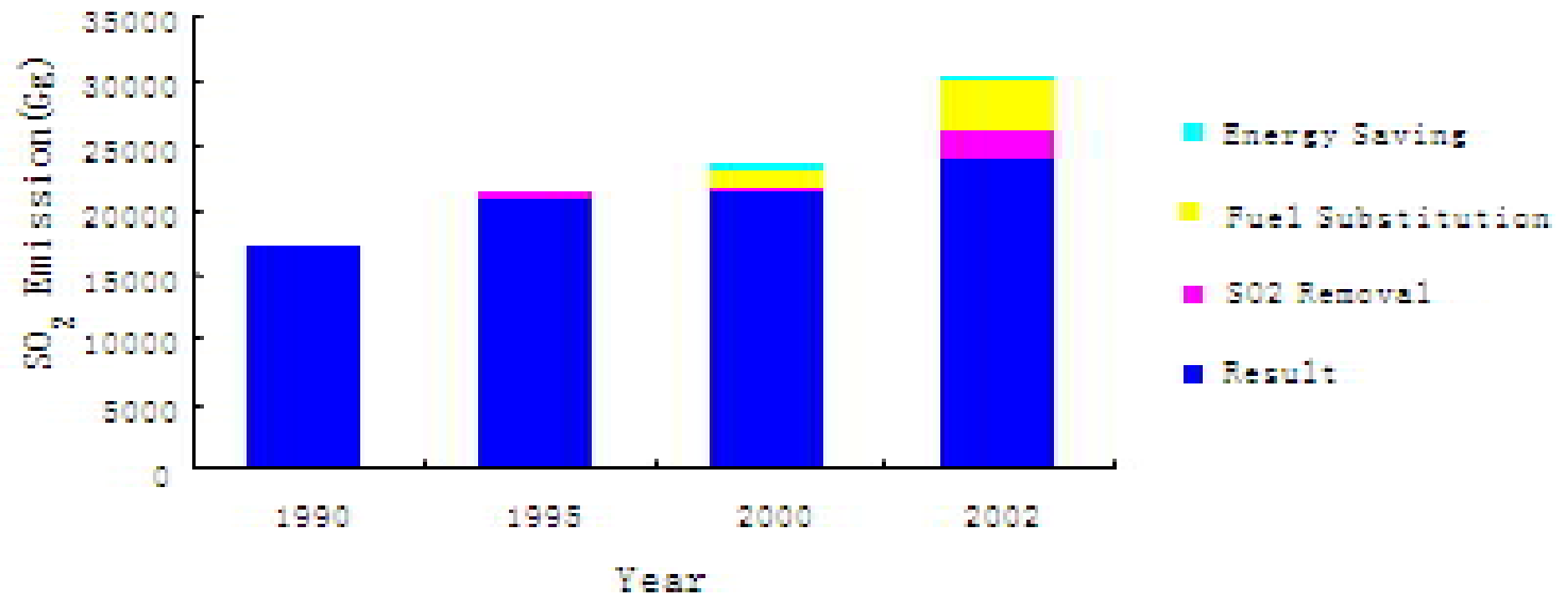
表 1 - 31 環境悪化による被害の経済評価 (実質額)

番 号	①	②	③	④	⑤	⑥	⑦
研究者名称	過・張 (1990)	社会科学 院(1998)	孫炳彦 (1997)	East-West Center (Smil, V., 1996)	世界銀行 (1997)	徐嵩齡 (1998)	夏光 (1998)
研究対象年	1983	1993	1992	1990	1995	1993	1992
実質被害合計 (億元, 1983年価格)	879.2	1,585.7	578.5	801.5(± 225)	1,498.4	1,545.9	520.3
環境汚染	381.6	499.4	578.5	217.2(±41.9)	1,498.4	443.6	520.3
大気汚染	124.0	211.5	319.3	91.7(±24.9)	1,388.5	179.9	305.4
健康損害	37.6	35.9	137.3	31.3(± 8.2)	1,202.1	63.5	106.4
死亡	(?)	[17.4]	(?)	[21.7]	397.1	19.8	(?)
酸性雨汚染	46.1	132.8	94.4	25.8(± 8.8)	141.1	73.6	73.9
水質汚染	251.8	150.1	252.0	72.3(±16.4)	109.9	139.0	187.8
健康損害	83.2	75.9	124.5	36.4(±11.5)	55.6	77.8	101.3
死亡	(?)	(?)	(?)	9.7(± 0.6)	(?)	39.5	(?)
固体廃棄物汚染等	5.7	137.8	7.2	53.2(± 0.6)	—	124.7	27.0
生態破壊	497.6	1,086.3	—	584.4(±183)	—	1,102.2	—
参考: GNP 物価指数 (1983年=100)	100.0	217.3	189.5	164.6	293.3	217.3	189.5

(注) 実質額は名目額と GNP 物価指数との比で算出。名目額は表 1-29に同じ, GNP 物価指数は『中国統計年鑑』1995, 96年版より算出。ほかは表 1-29に同じ。

# 実際のSO<sub>2</sub>排出量と環境対策の効果

Effect of different measure



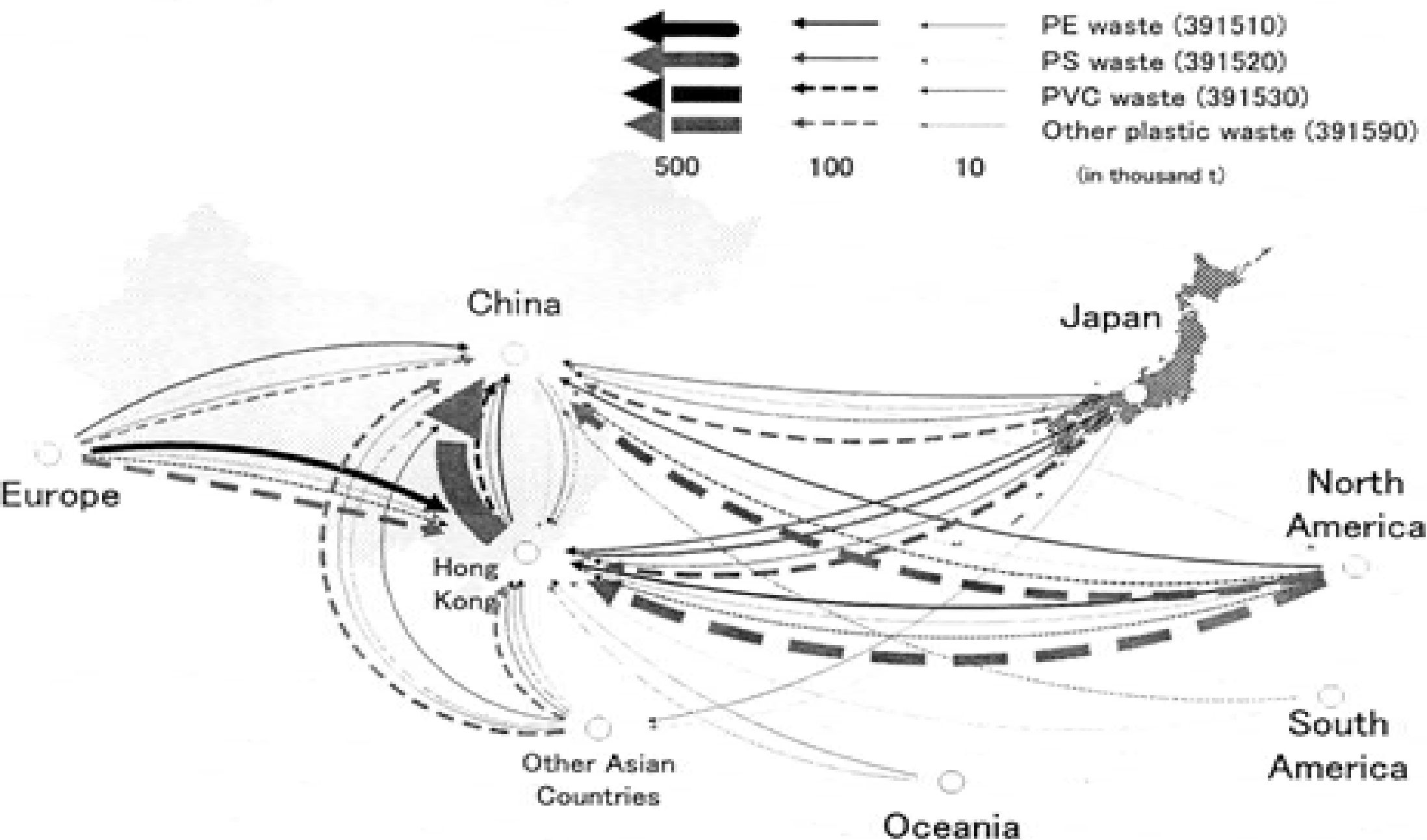
# Causes of pollution in China

- Energy (coal)/Industrial structure(heavy)
- Enforcement capacity of environmental policy
- Lack of environmental infrastructure
- Economic system(catch-up and transition) . . . domestic and global
- Government/Judicial/Political system
- Societal environmental consciousness . . . education/learning capacity

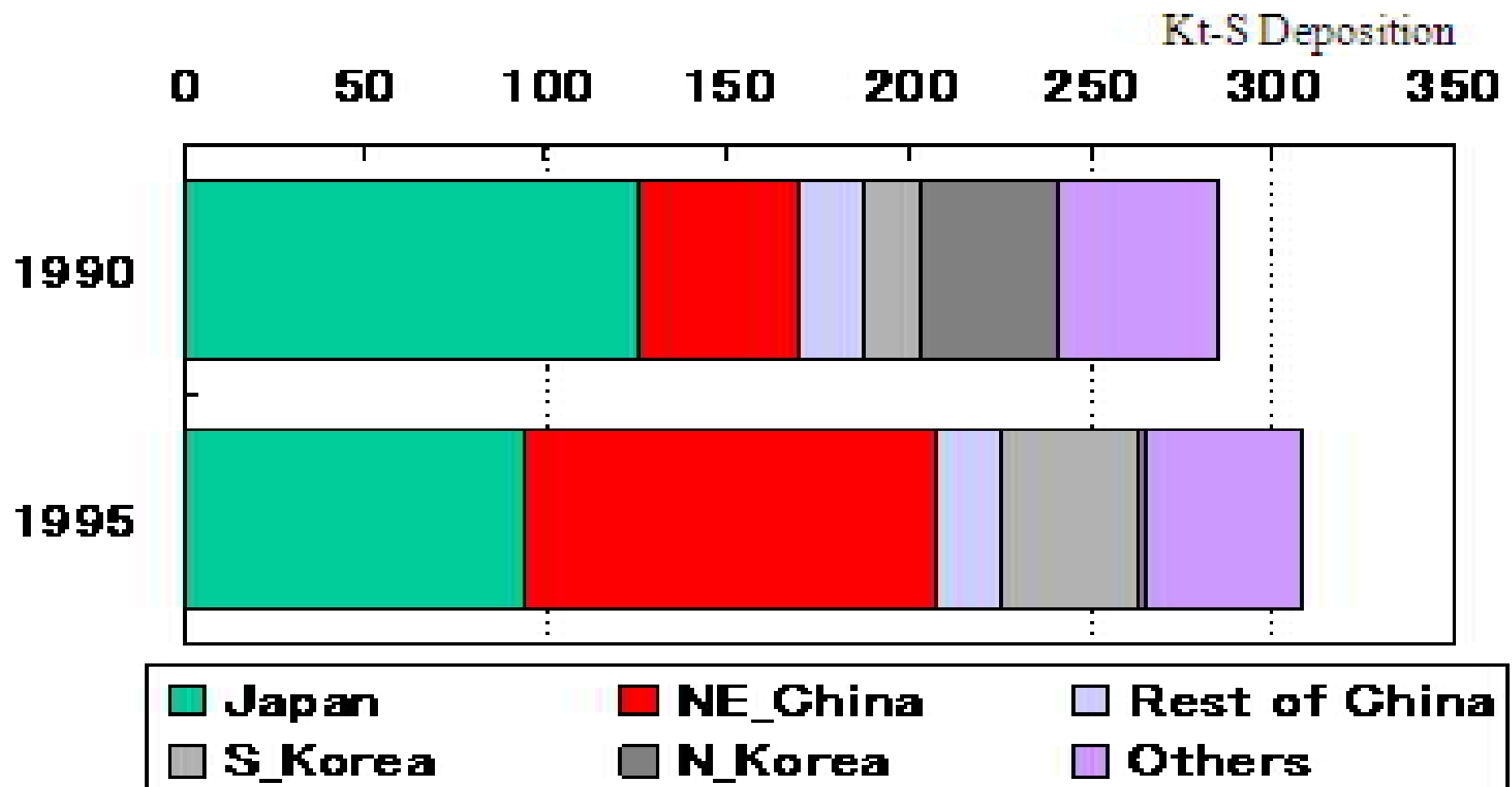
# Environmental Governance in East Asia

- A comparison of environmental governance between current China and Japan in late 1960s/1970s
- Top-down environmental policy----advantages and disadvantages
- Environmental policy in the relationship of central government and local government
- Behavior of local government

# Material Flow of Waste Plastics, 2002

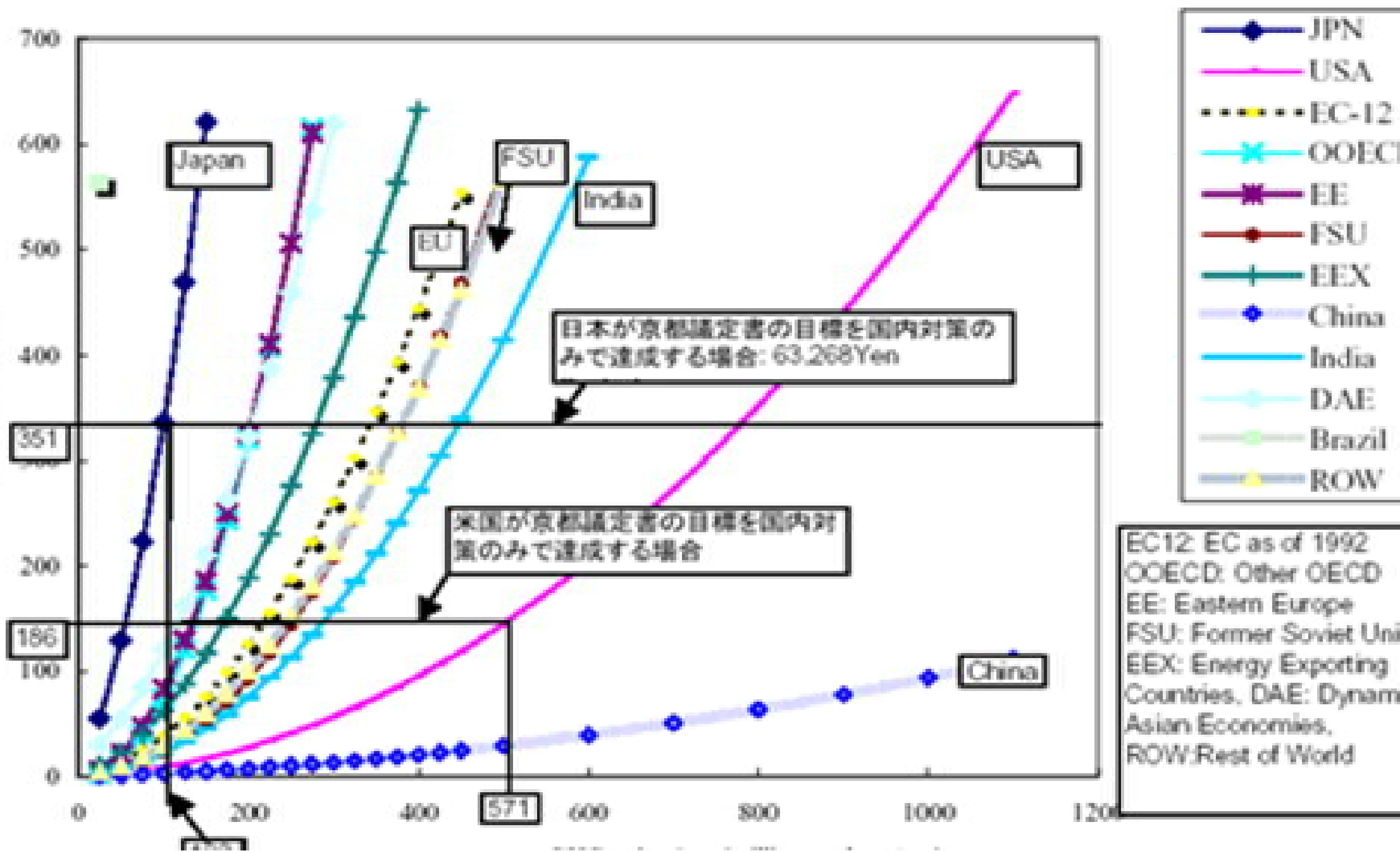


# Sulfur Deposition in Japan Contributed by Source in 1990 and 1995



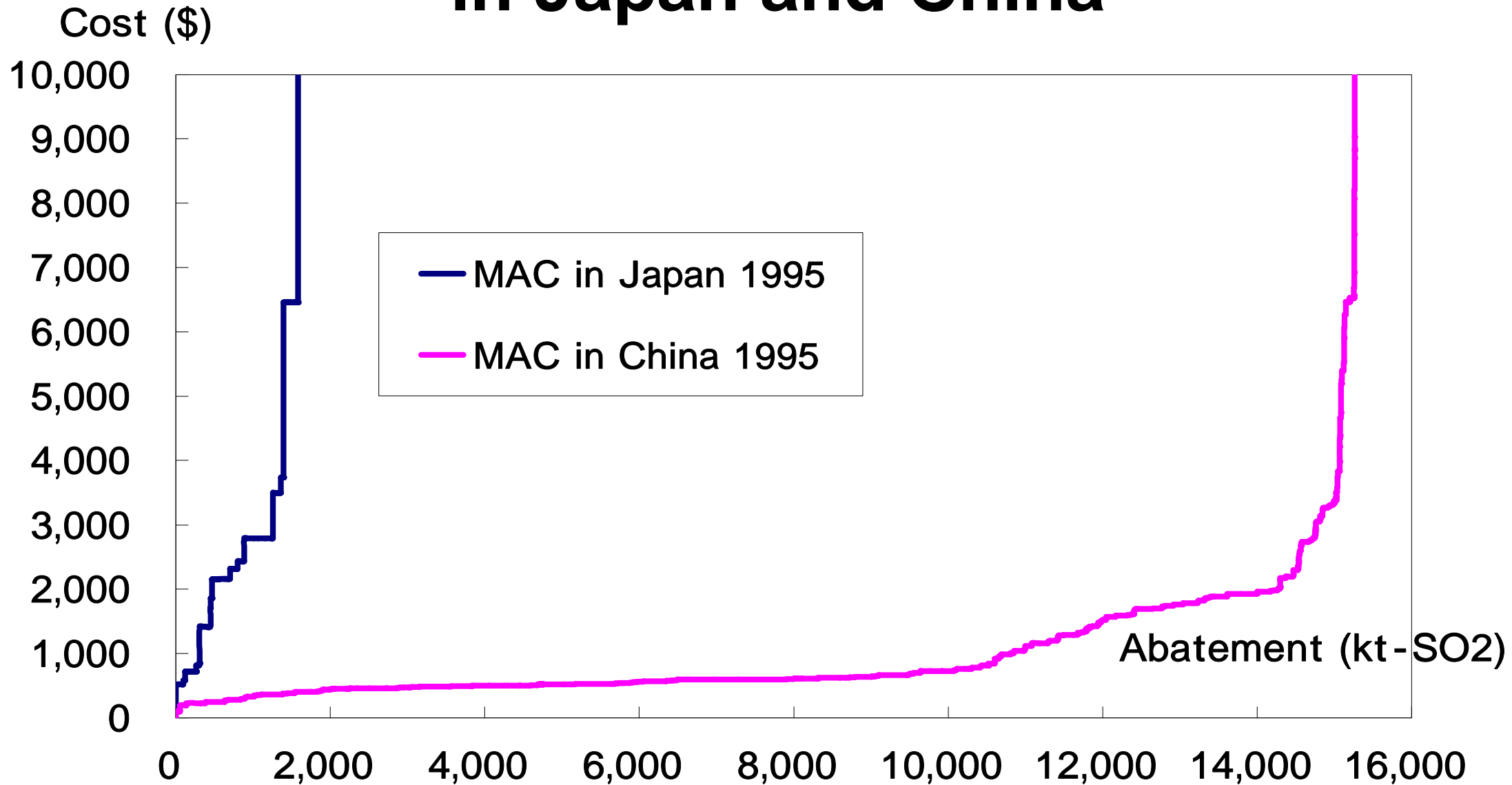
Nakata and Ueta (2007) "Sulfur Emissions Control in China," Energy and Environment.

# MAC of CO2 in China, Japan, etc.



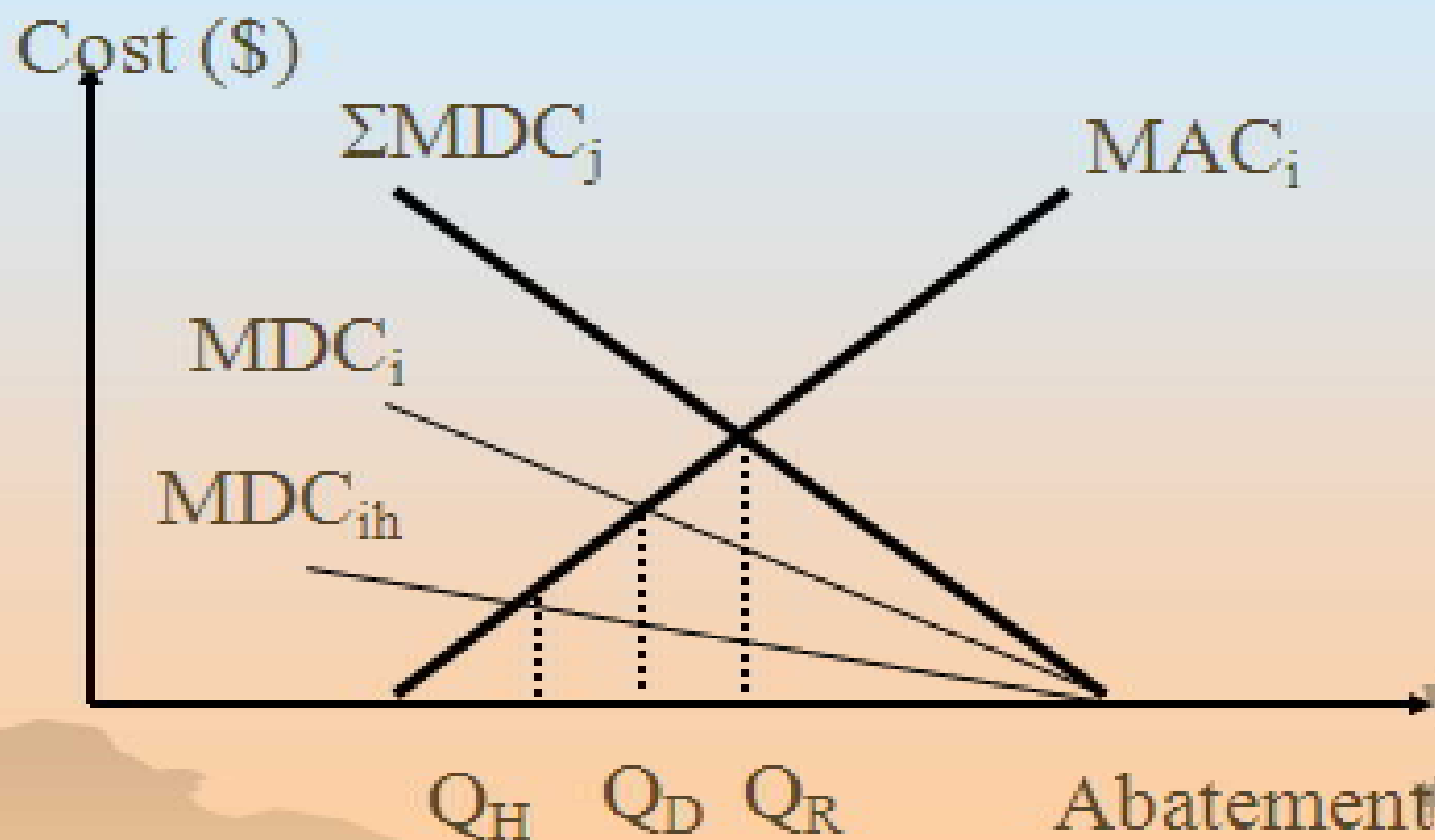


# Marginal Abatement Cost Curves in Japan and China



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

- Ecological interdependence with economic . .
- MAC of CO<sub>2</sub>/SO<sub>2</sub> in China and Japan
- Local pollution and environmental/health damage in China
- Domestic and regional optima
- Co-benefits (Ancillary benefits)
- Clean Development Mechanism

# Conclusion(1)

- Institutions/governance for sustainable development
- Institutions for creating knowledge, innovation /diffusion/transfer system(IPR)of technology
- Global democracy/equity/fair market
- Crucial role of central government

# Conclusion(2)

- Network/communication of local initiative
- Multi-level environmental governance for sustainable development
- Regional economic/environmental community---collaboration for common base of scientific knowledge---Regional IPCC
- Contribution of intellectual network

- Source

- Slide 7, 9, 10, 14 :Ueta and Mori (2007)
- Slide 18 :Yamamoto (2008)
- Slide 21 :Yoshida (2005)