Innovation Comparison in Asia

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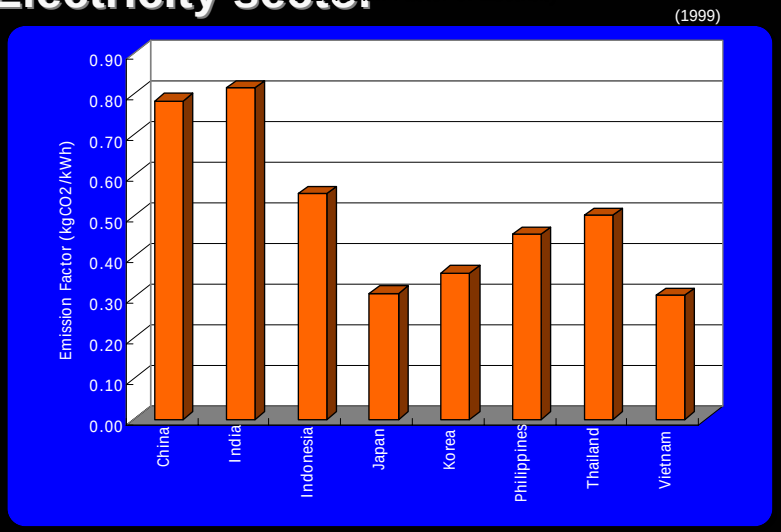
The 8th AIM International Workshop
13-15 March 2003

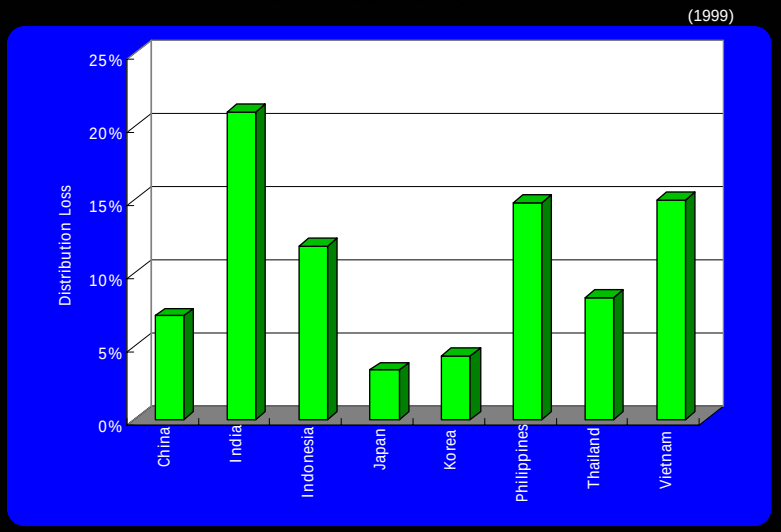
Innovation Indicators

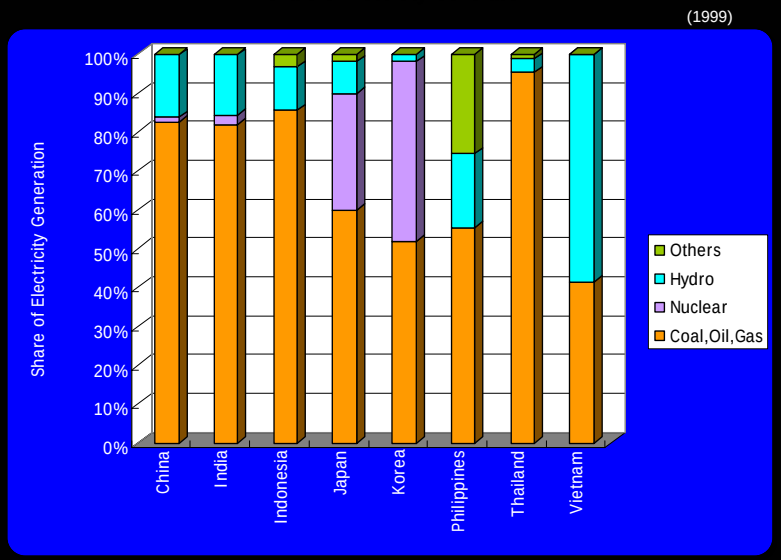
- Environmental Efficiency Indicators
- Environmental Production Indicators
- Environmental Consumption Indicators
- Environmental Governance Indicators

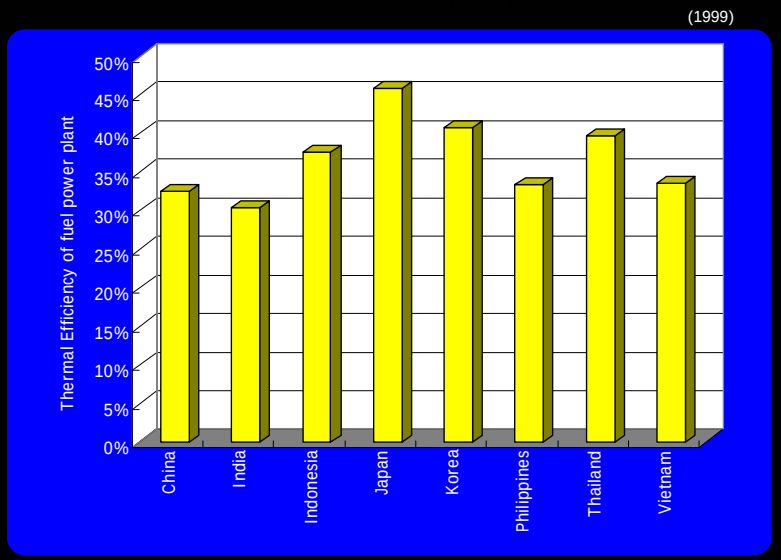
→ Sector-wise Indicators

Electricity sector



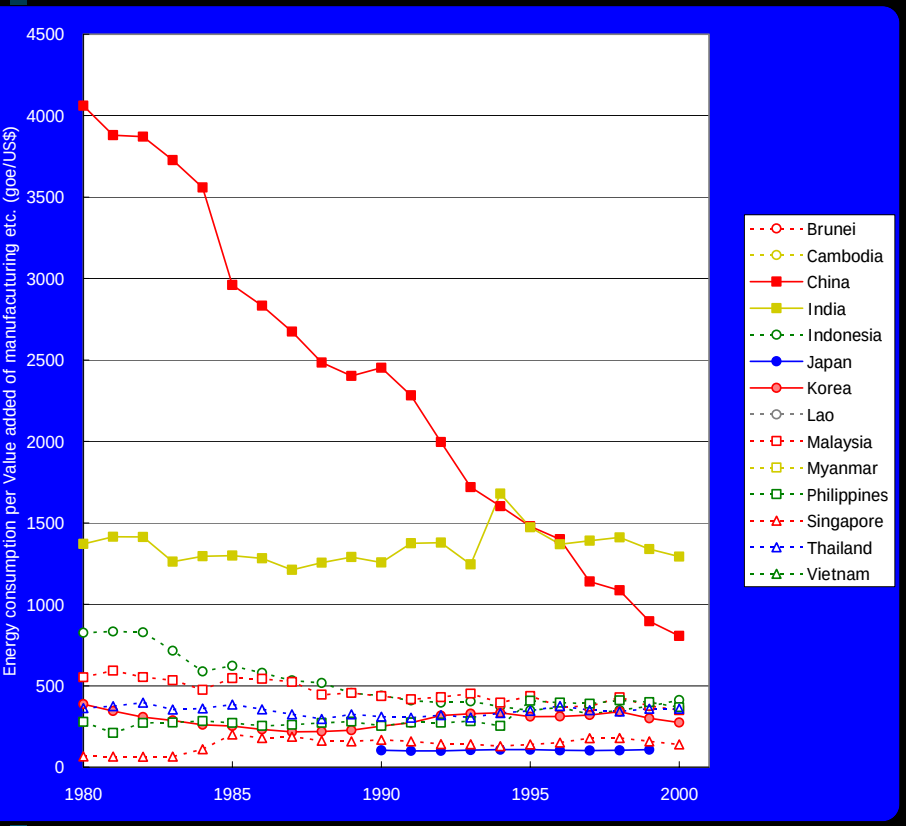






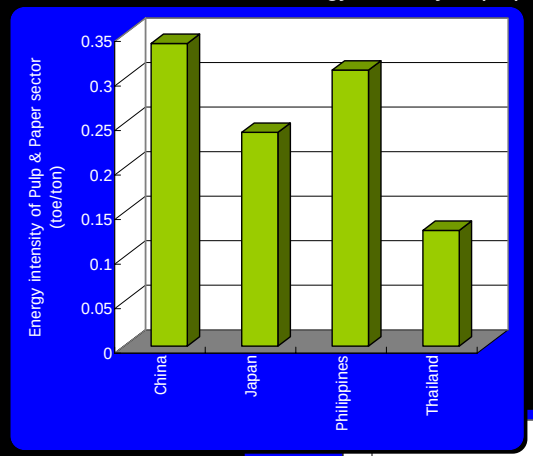
Industrial sector

Energy consumption per Value added of manufacturing etc.

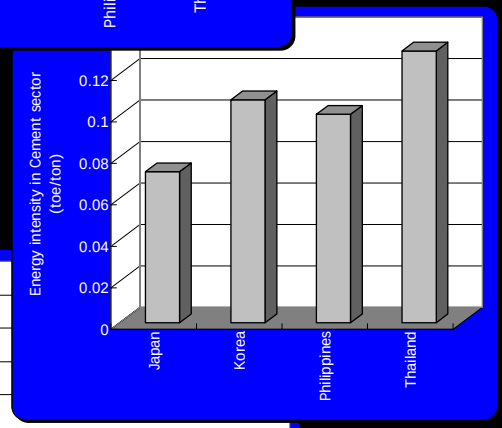


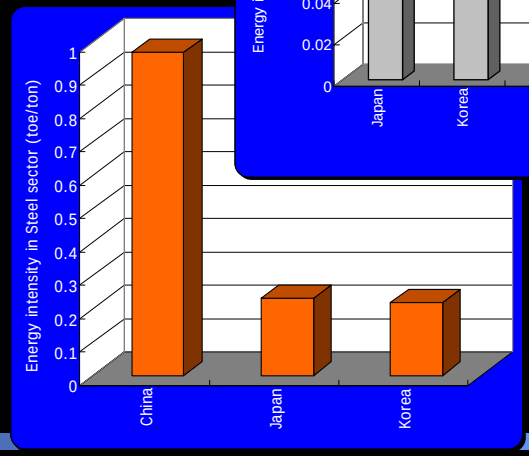
Source: IEA, World Bank

Energy intensity in pulp and paper sector (1993)



Energy intensity in cement sector (1995)

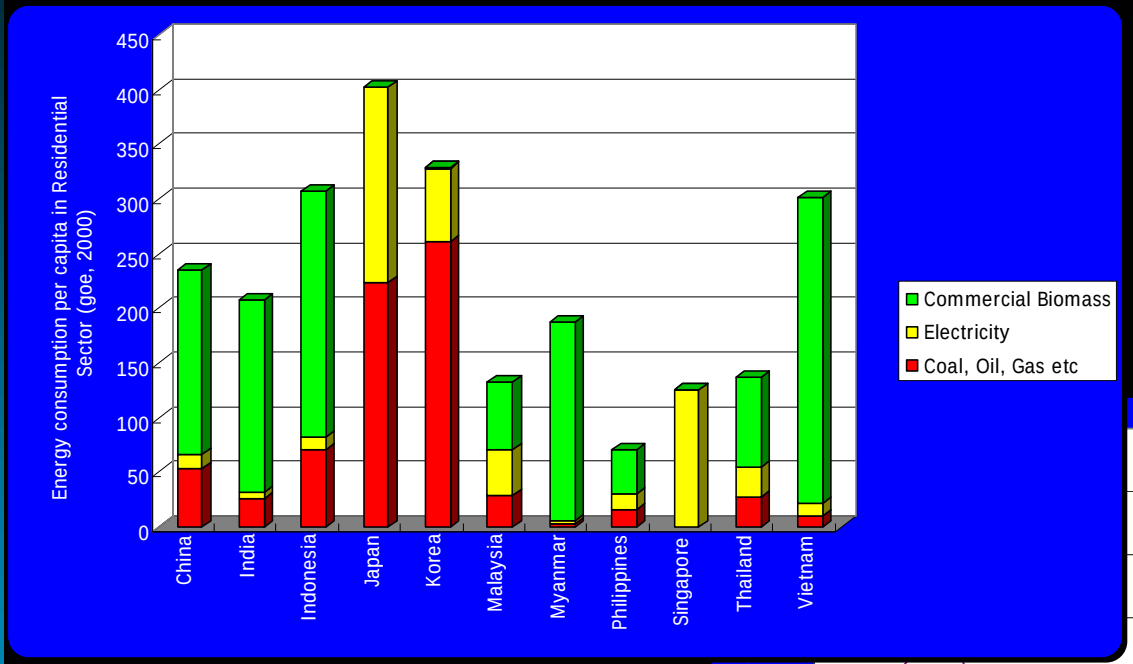




Energy intensity in steel sector (1994)

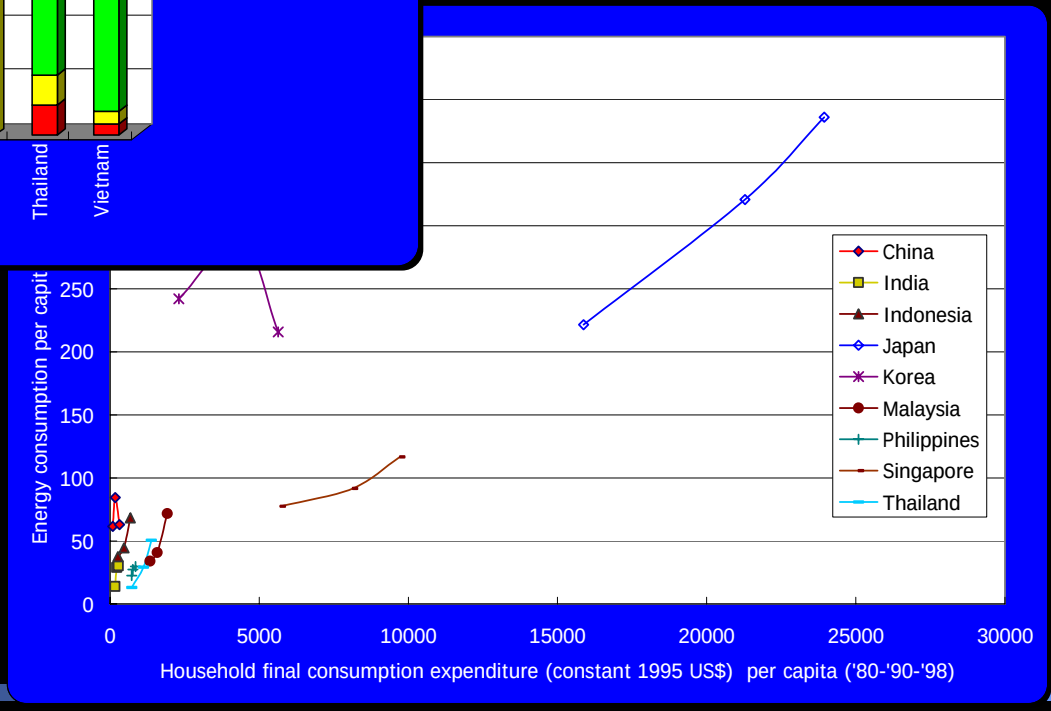
Residential sector

Energy consumption per capita in residential sector



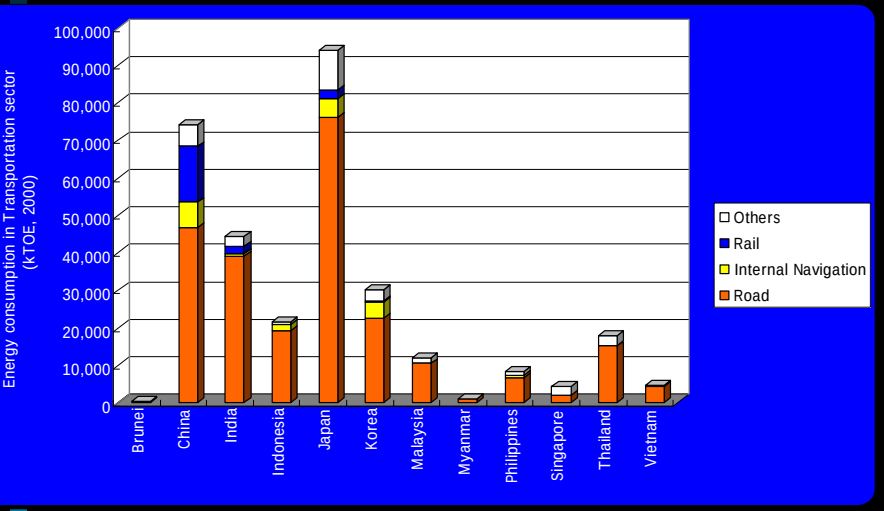
Source: IEA, World Bank

Energy consumption per capita – Household final consumption per capita



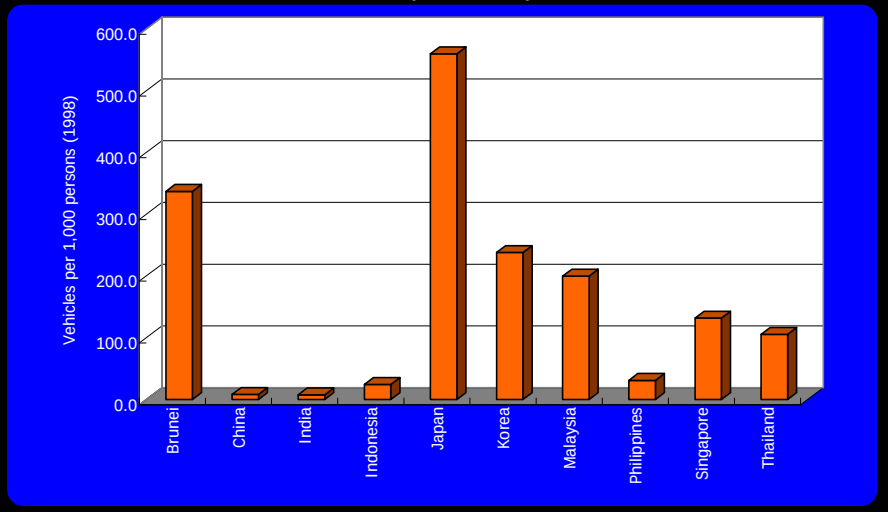
Transportation sector

Energy Consumption in Transportation Sector



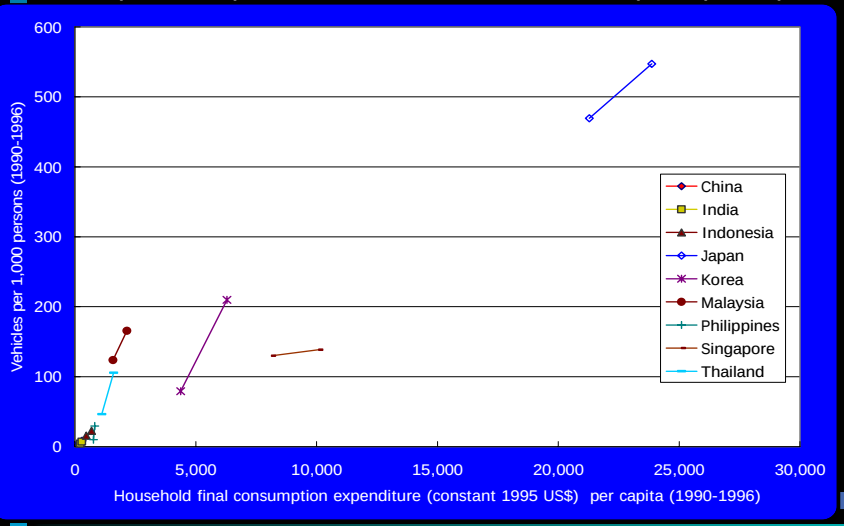
Source: IEA

Vehicle per 1000 persons

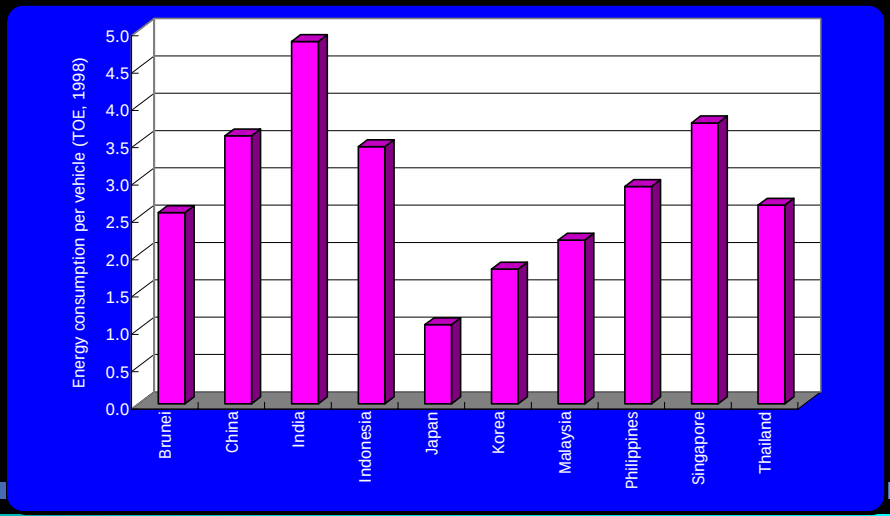


Source: IRF

Vehicle per 1000 persons – Household final consumption per capita

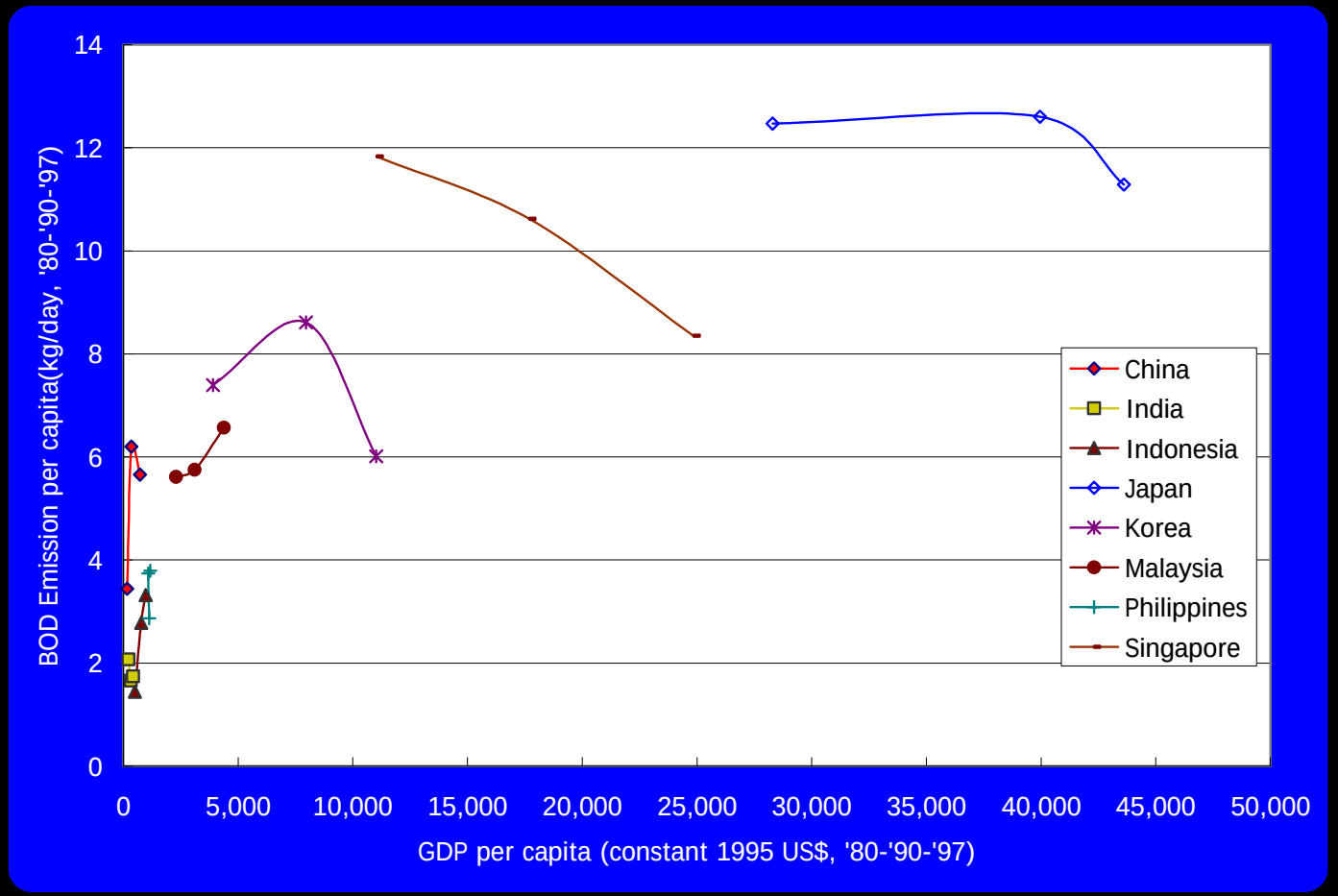


Energy consumption per vehicle



Industrial sector

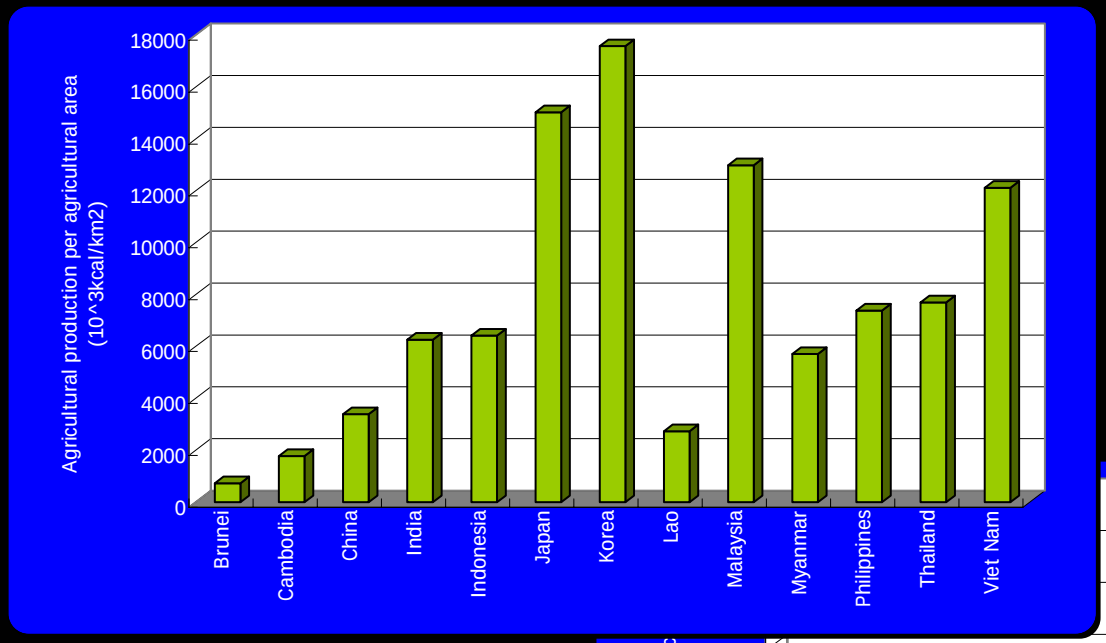
Water pollutant per capita – GDP per capita



Source: World Bank

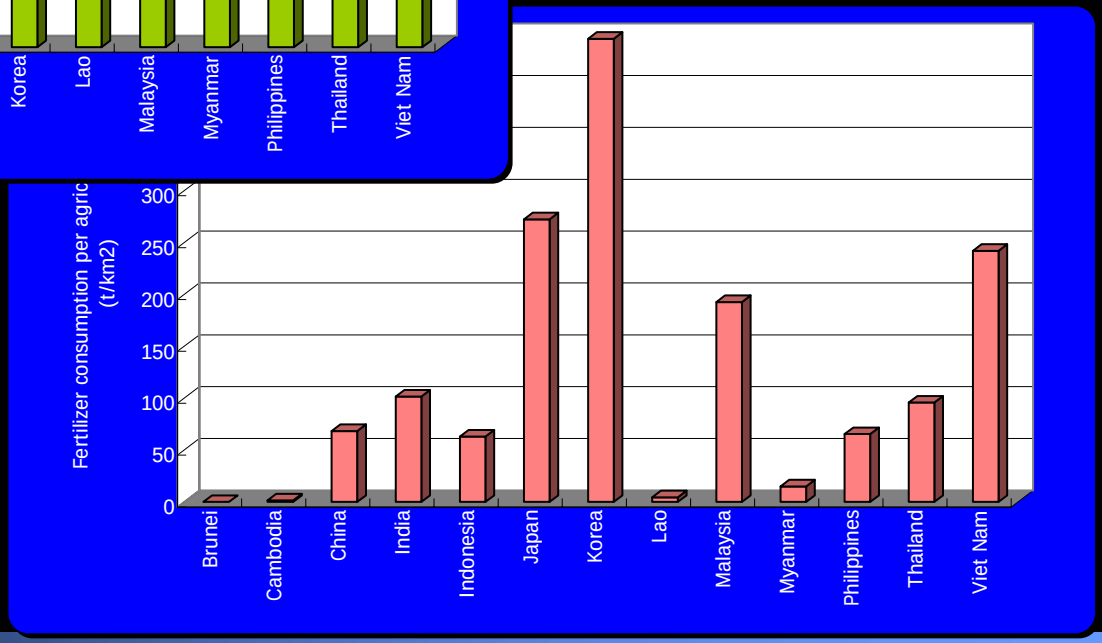
Agriculture sector

Agricultural production per agricultural area (1999)



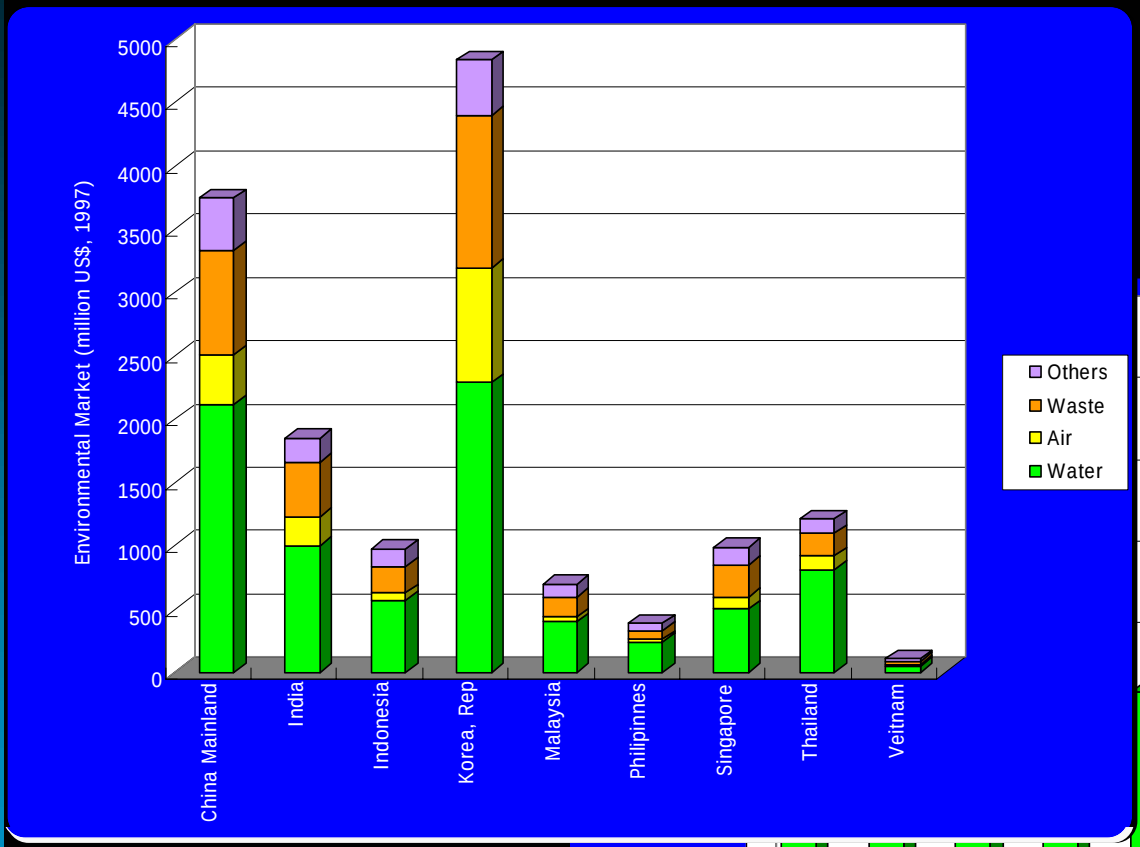
Source: FAO

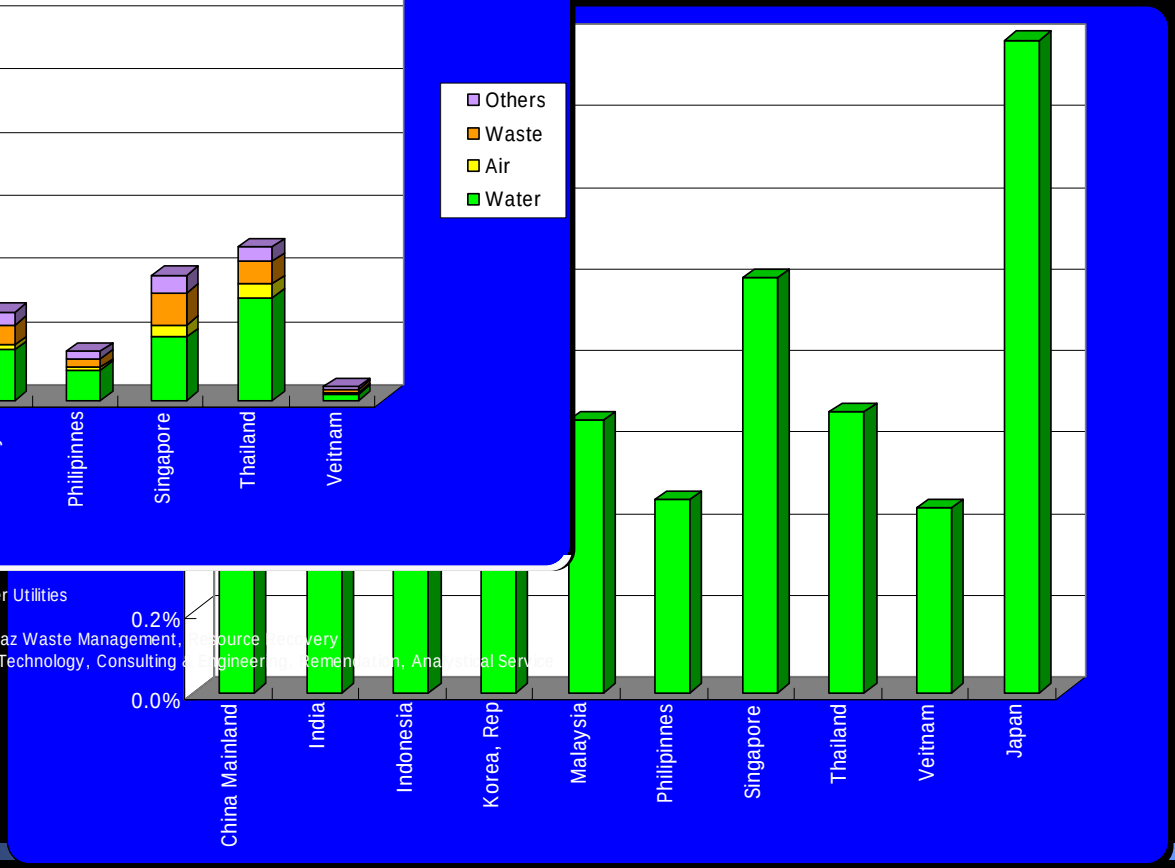
Fertilizer consumption per agricultural area (1999)



Source: FAO

Environmental Market

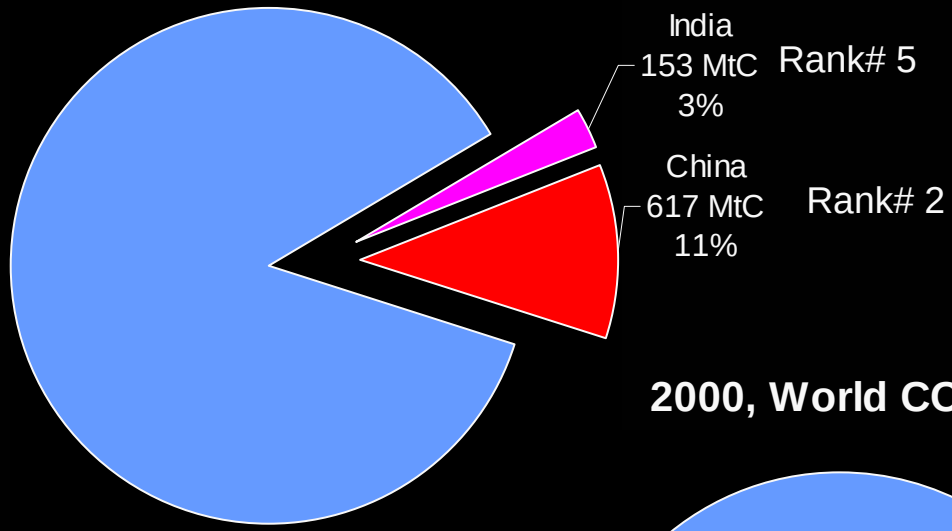




* Water:Water Equipment & Chemicals, Water Treatment Works, Water Utilities
Air : Pollution Control
Waste : Waste Management Equipment, Solid Waste Management, Haz Waste Management, Resource Recovery
Others : Instruments & Monitoring Systems, Processes & Prevention Technology, Consulting & Engineering, Remediation, Analytical Service
Source : EBI "Asia Country Briefings"

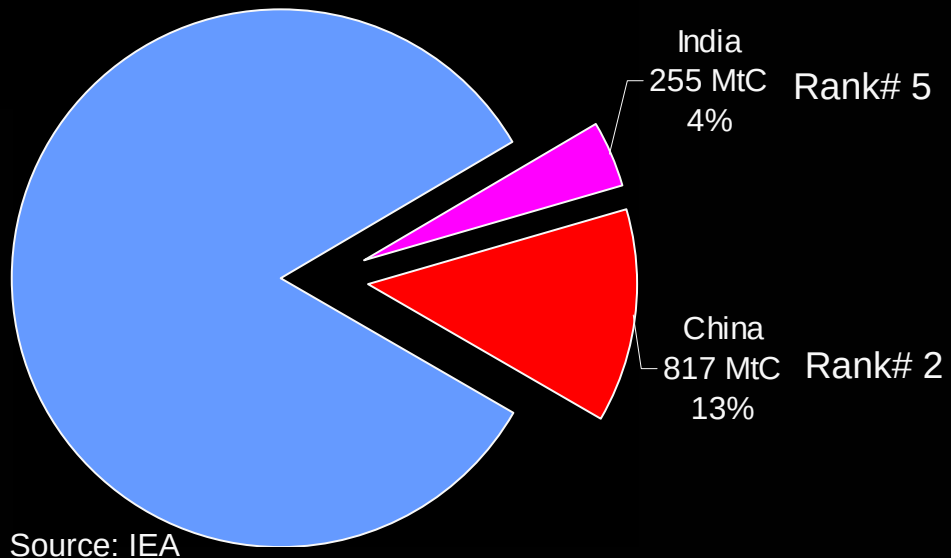
India and China: Share in World Emissions – CO2

1990, World CO2 Emissions 5827 MtC



Source: EIA

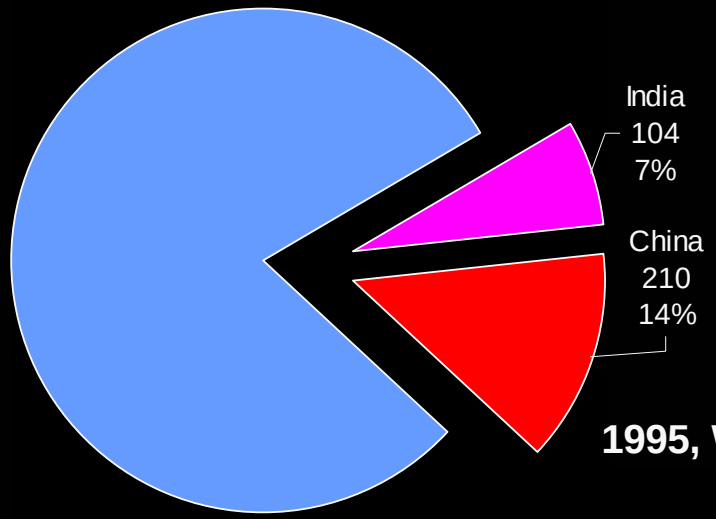
2000, World CO2 Emissions 6393 MtC



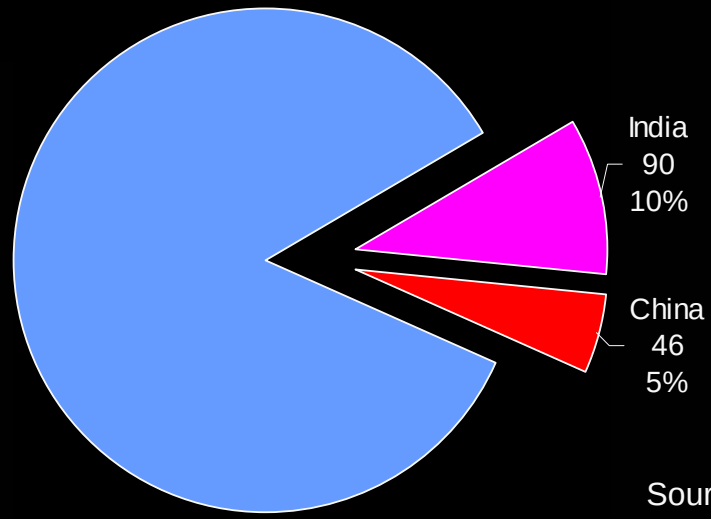
Source: IEA

India and China: Share in World Emissions – Non-CO2

1990, World CH4 Emissions 1554 MMTCE

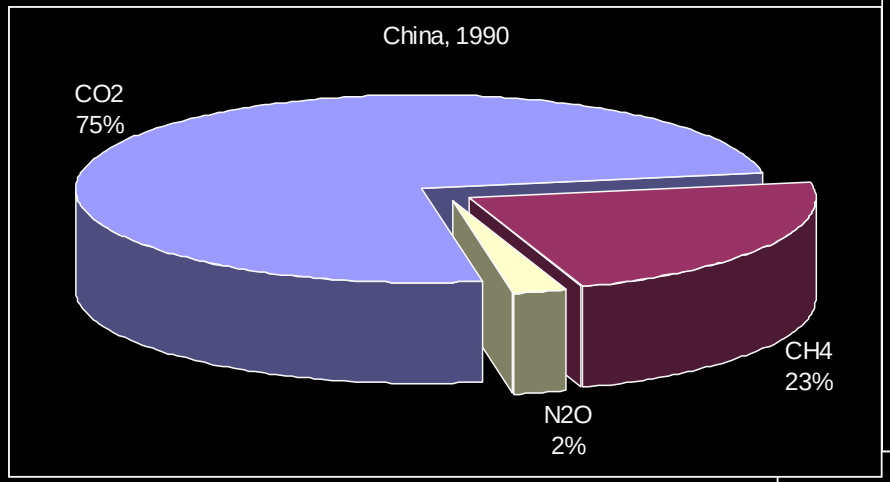


1995, World N2O Emissions 904 MMTCE



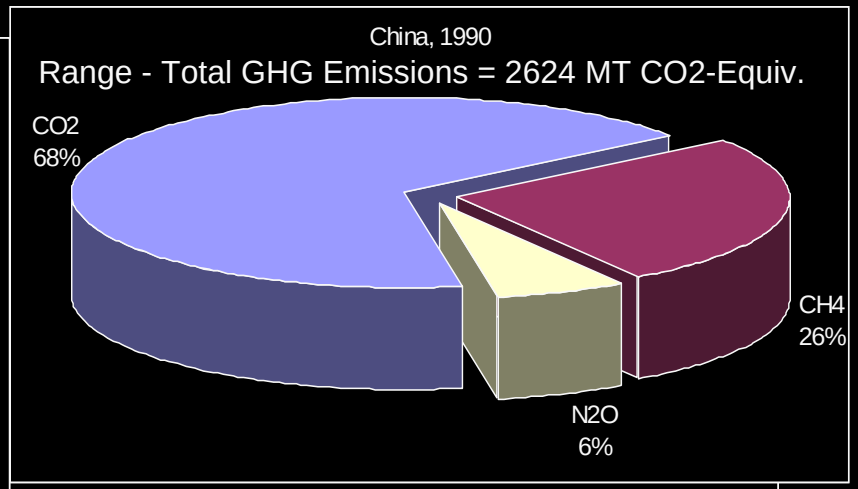
Source: EMF21

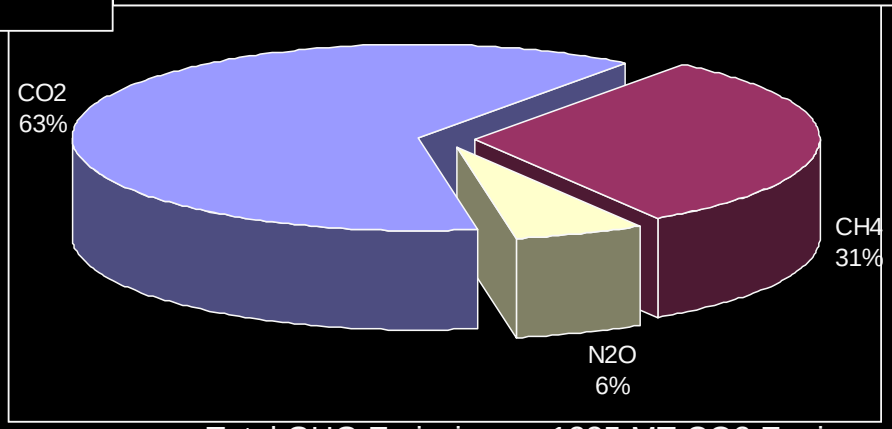
Share of GHGs in China and India



Total GHG Emissions = 2362 MT CO2-Equiv.

Source: ALGAS

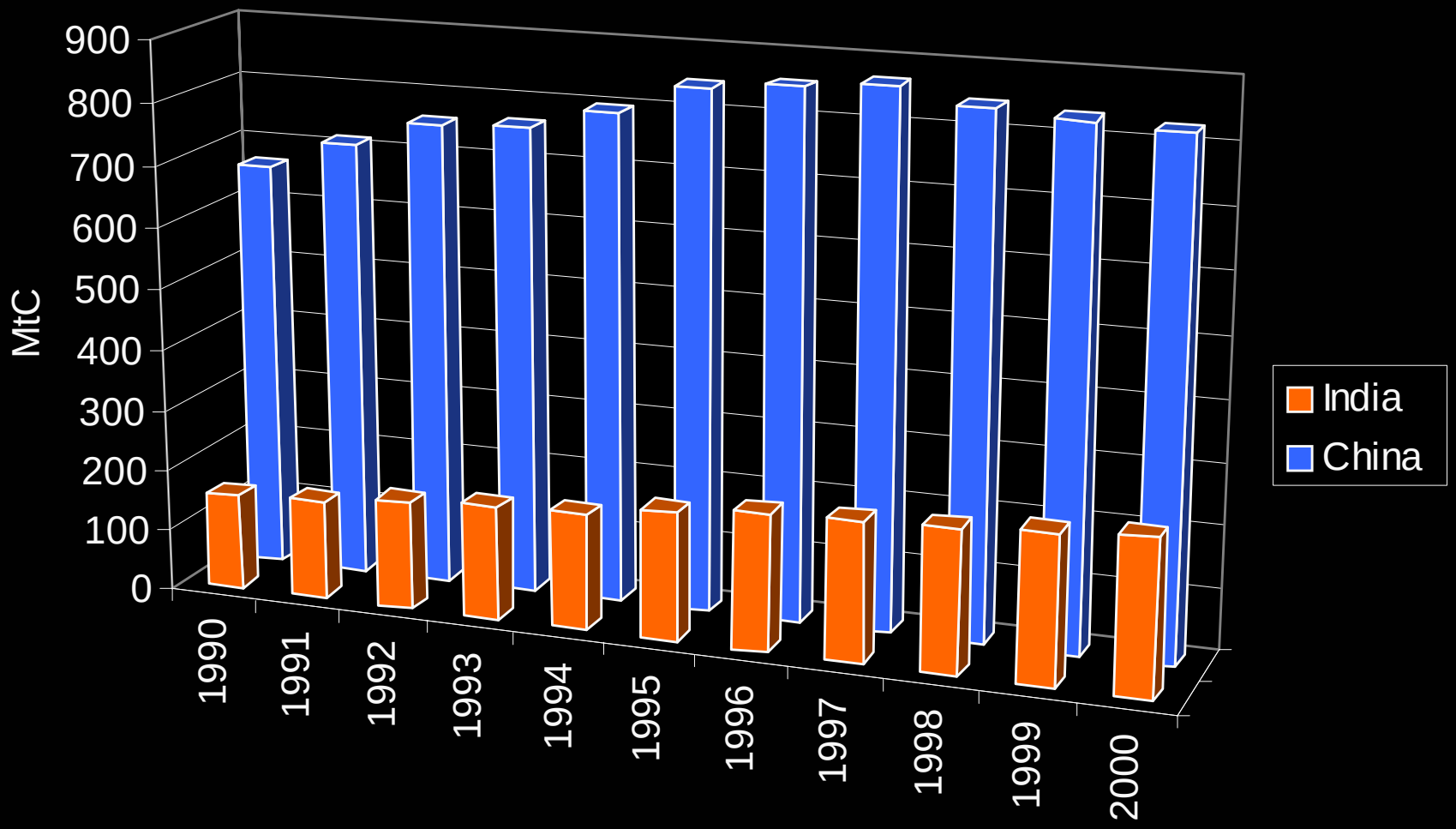




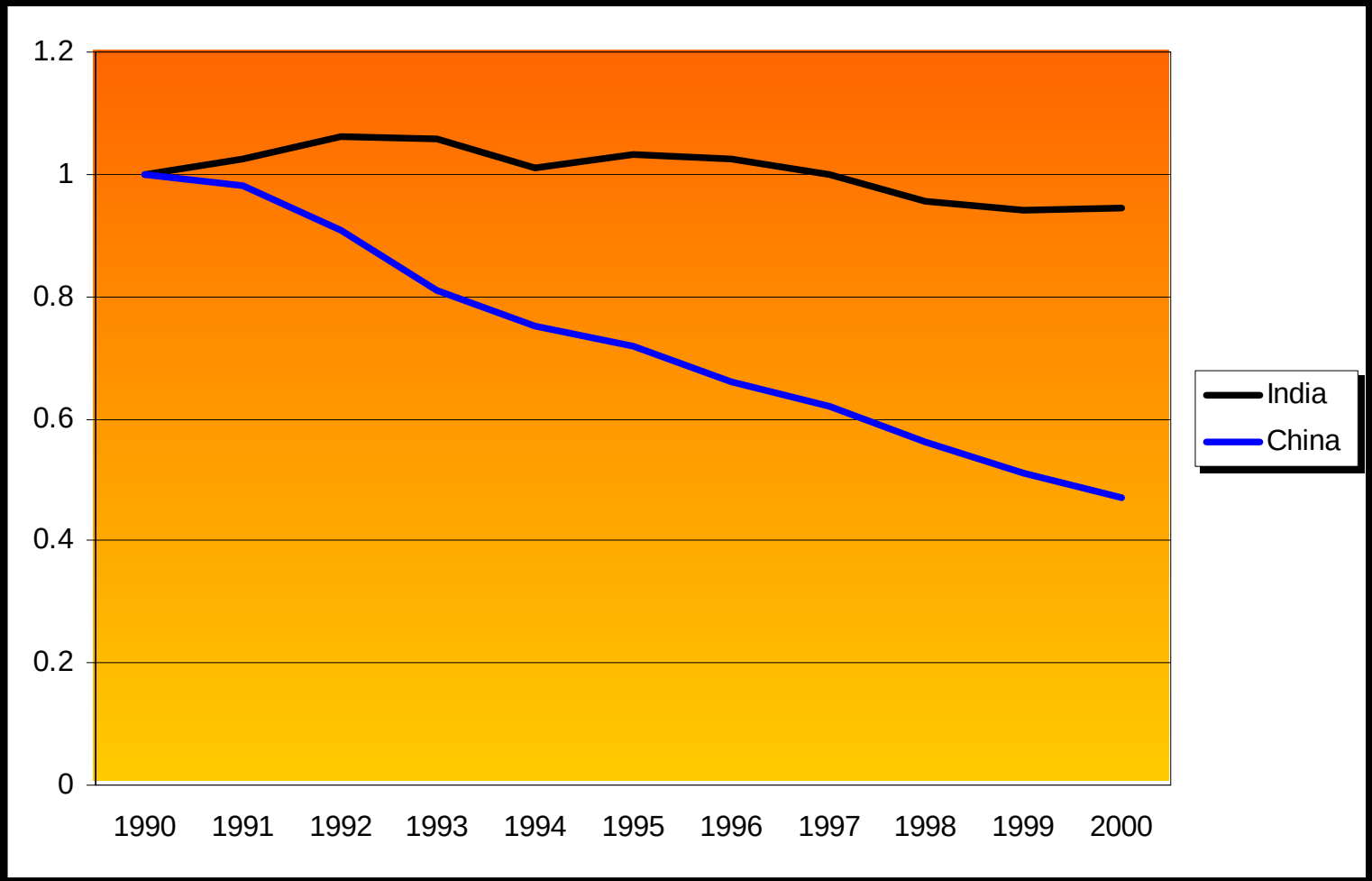
Total GHG Emissions = 1235 MT CO2 Equiv.

Source: Garg and Shukla, 2002

CO2 Emissions

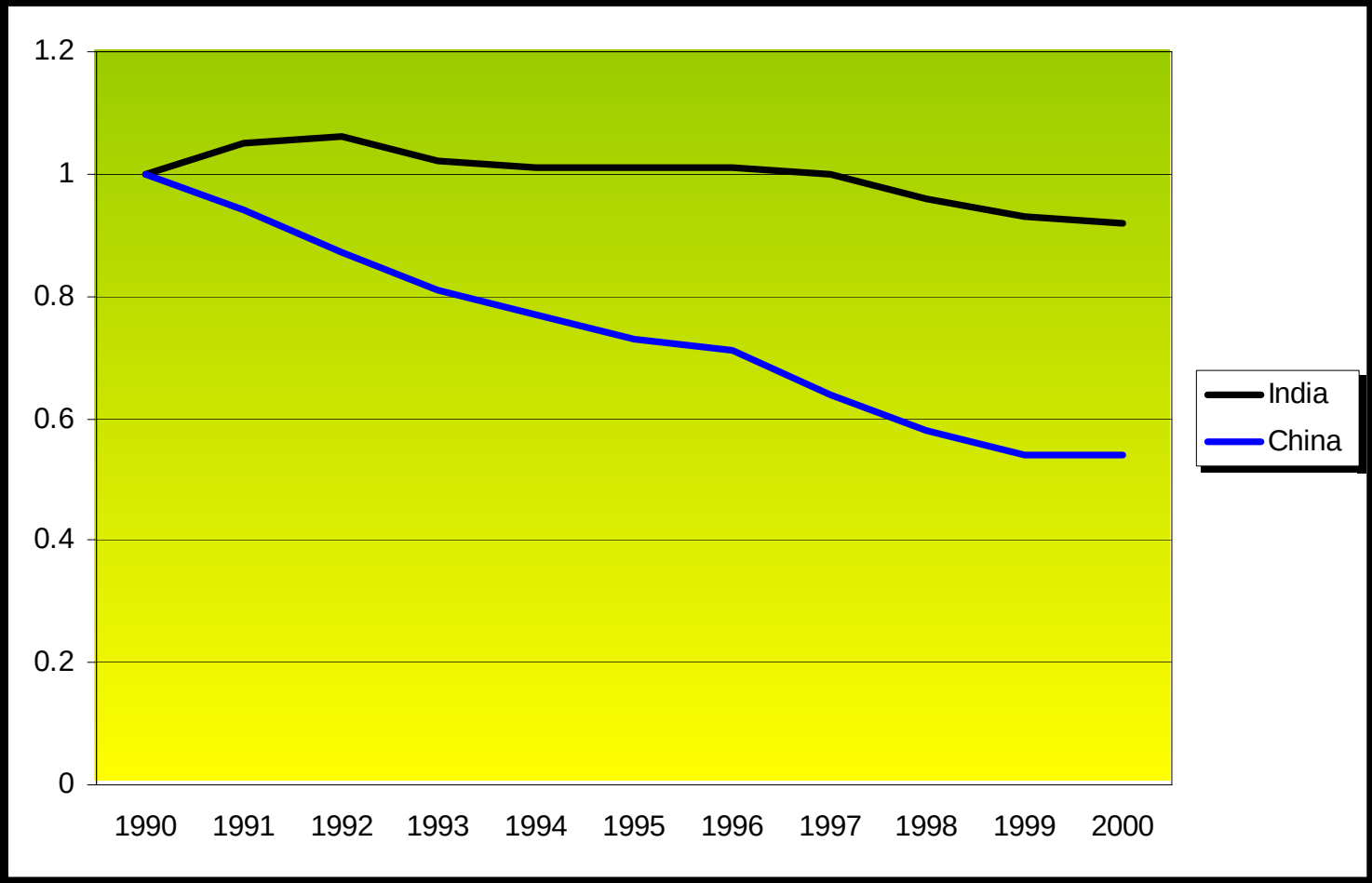


CO2 Intensity Index 1990 = 1



Energy Intensity

Index 1990 = 1

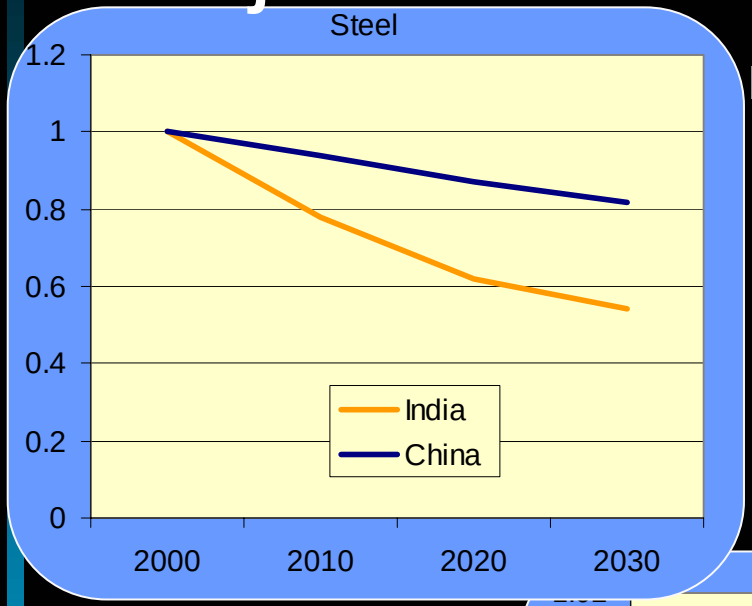


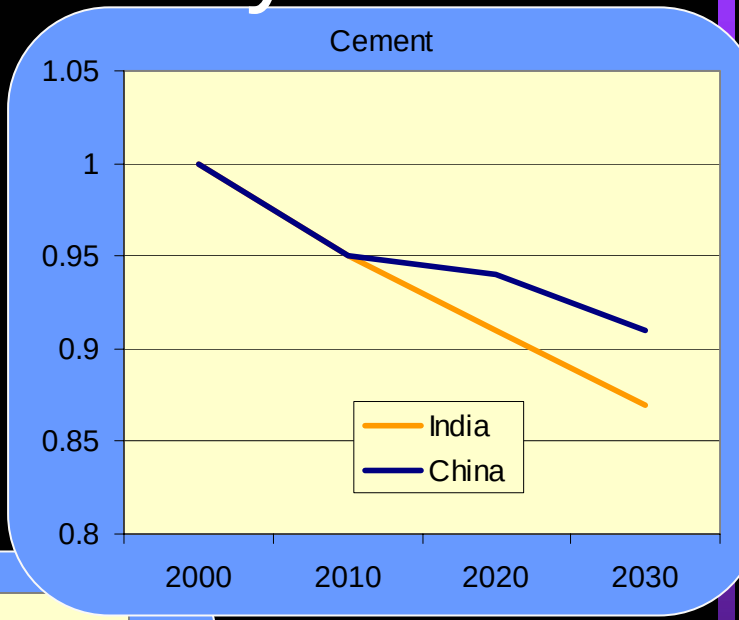
Reasons for such intensity trends

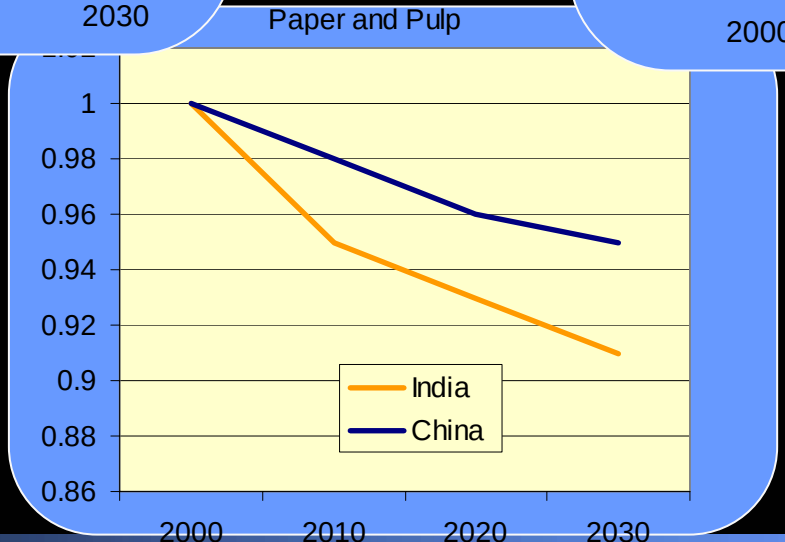
- Technology progress
  - Steel industry in India and China
  - Power generation and Building material industry in China
- Change in fuel mix
  - More use of cleaner fuels
- Structural change of economy
- Effect of local environmental policies (in case of China)

Projection of Energy Intensity

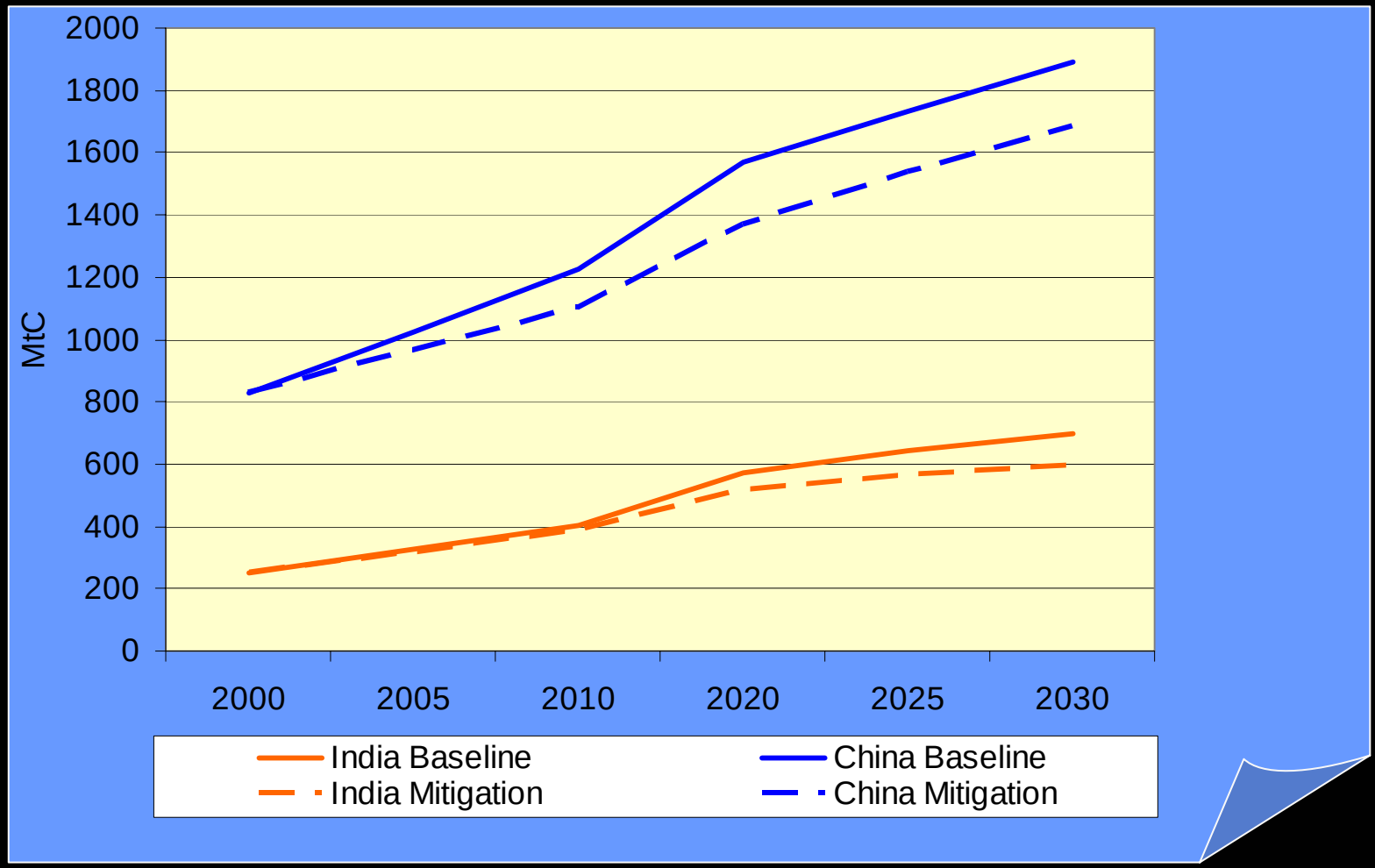
Index 2000 = 1





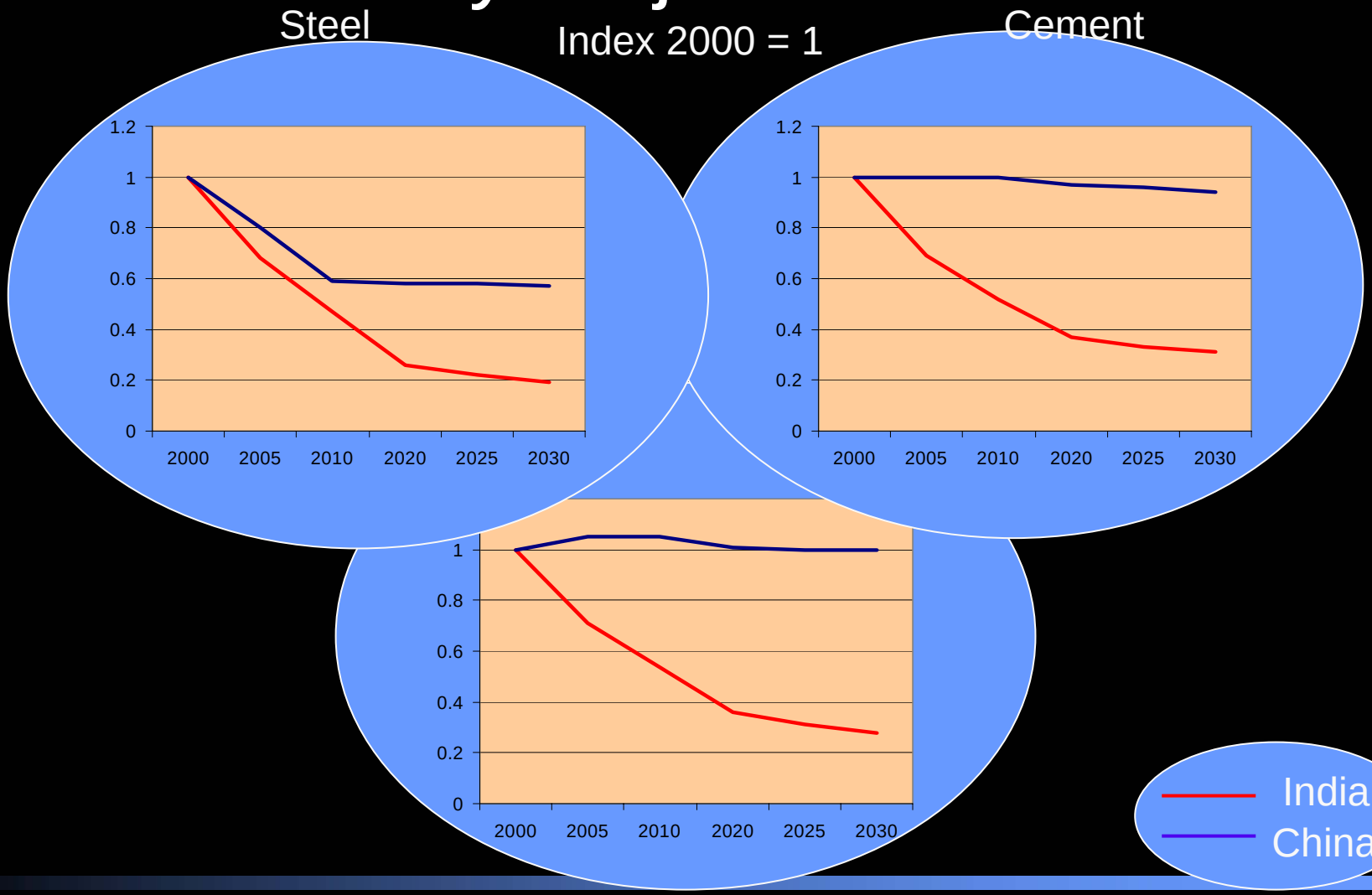


CO2 Emissions Projection



CO2 Intensity Projection

Index 2000 = 1



Technology substitution

Technologies gaining share over other types of technologies in Steel industry

- China
  - New Coking Oven + Coke Wetting
  - Japanese Sintering Furnace
  - Wet TRT
  - Directing Hot Strip Mill Machine
  - DCF, Japanese ACF & DCF
- India
  - Improved coke oven
  - Improved sintering machine
  - Improved OF with gas recovery
  - Improved gas based sponge iron making
  - Improved Hot Rolling