Energy and emission embodied within China’s international trade

He Jianwu
Development Research Center of the State Council, China
3, September 2008

Note: the views expressed in this PPT should not be attributed to author’s institution
Outline

- Introduction
- Methodology
- Main Result
Economic growth and international trade
Export and energy consumption

- Total Energy Consumption
- Total Exports
Pollution Emission

- In 1994, total greenhouse gas emission is 4.06 billion TCO₂E, of which 3.07 billion tons is CO₂; In 2004, total greenhouse gas emission increase to 6.1 billion TCO₂E, of which 5.07 billion tons is CO₂.

- In 2000, total greenhouse gas emission in China accounts for 14.4% of total world emission, USA for 23.96%.

Data source: World Bank, WDI 2006

Data source: The People's Republic of China Initial National Communications on Climate Change
Composition of industrial value added by the energy intensity
Composition of Manufacturing export by sector

- Coal
- Crude petroleum and natural gas
- Metal ore mining
- Non-ferrous mineral mining
- Food and tobacco
- Textile
- Apparel
- Paper, printing and record medium
- Petroleum and coal products
- Non-metal mineral products
- Chemicals
- Metals smelting and pressing
- Meat products
- Machinery and equipment
- Transport equipment
- Electric equipment and telecommunication equipment
- Other manufacturing products
- Electricity
- Gas production and supply
- Water production and supply

1993 vs. 2004
Embodied energy and emission

Methodology

- Embodied energy (pollution emission) in international trade is to total direct and indirect energy consumption (pollution emission) within products used domestically to export.

\[ X = (I - A^d)^{-1} Y \]

\[ E = e \cdot \left[ (I - A^d)^{-1} Ex \right] \]

Where, E is the embodied energy /emission;
  e is the energy consumption/emission per output by sector;
  Ex is the export vector;
Embodied energy (pollution emission) within export from country a to country b, i.e., import by country b from country a

\[ E_{a,b} = e_a \cdot \left[ (I - A_a^d)^{-1} Ex_{a,b} \right] \]
Data

- China’s 2005 IO table
- GTAP database V.7
- IEA database
- Other data
Embodied energy consumption within China’s international trade
Embodied CO$_2$ within China’s international trade
Embodied SO$_2$ within China’s international trade
Thanks for your attention!