

China Low Carbon Development Side Event

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Embodied Emissions in Trade of China

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Outline

- Embodied emissions consideration
- Border Carbon Adjustment (BCA) discussion
- Conclusion



Production-based or consumption-based emissions accounting

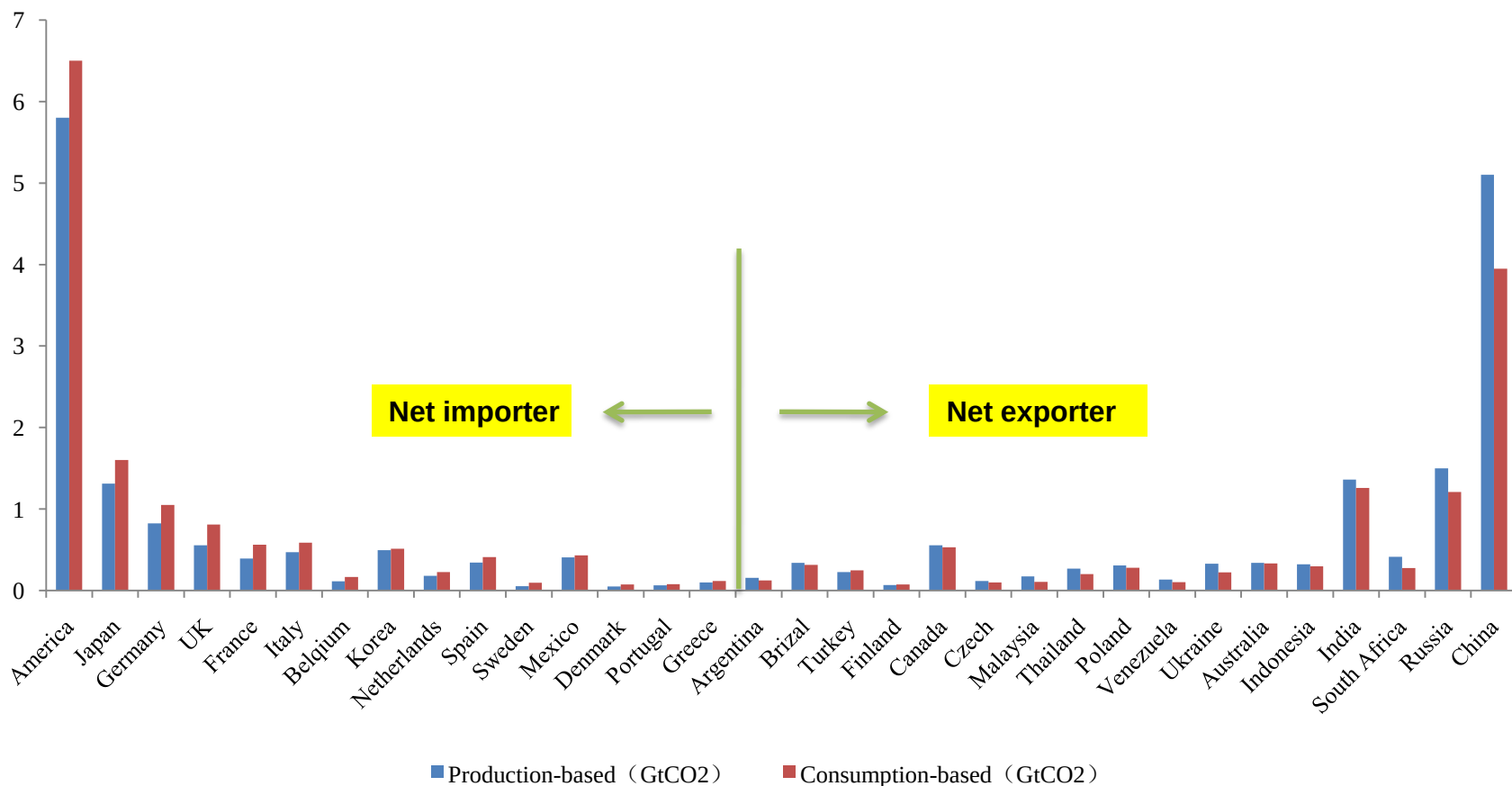
- Much attention has focused on the CO₂ emitted from its domestic energy consumption by each nation
- Consumption-based accounting differs from traditional production-based accounting
- Goods are produced by one country and consumed by other countries, the emissions during production should be counted to the consumer.

Production-based accounting	Consumption-based accounting
Emissions from domestic energy consumption	Emissions from domestic energy consumption+ import embodied emissions- export embodied emissions

- Global trade emissions: approximately 6.2 GtCO₂, 23% of total emissions, most is emitted for developed countries final consumption requirements



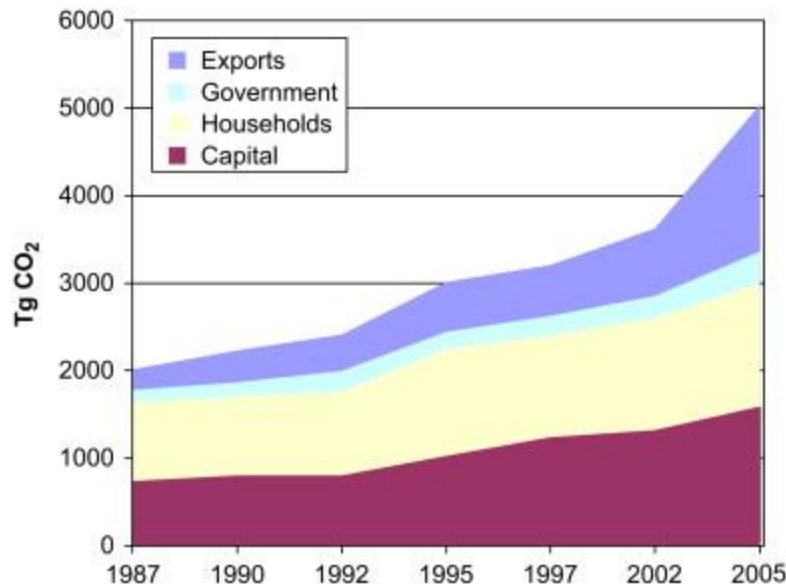
Production-based or consumption-based emissions accounting



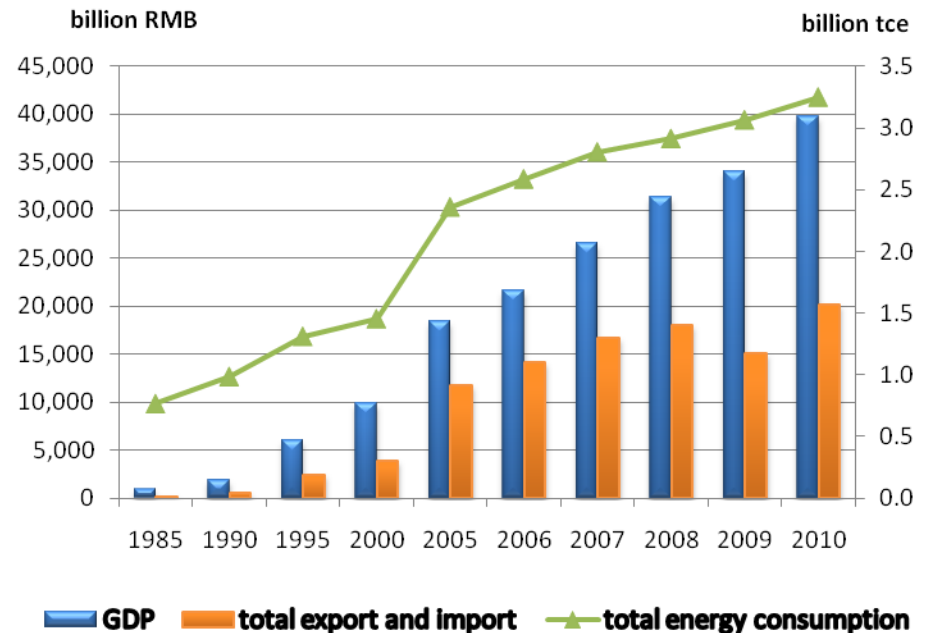
Source: Steven J. Davis¹ and Ken Caldeira (2010)

Export drives energy consumption increase

- ◆ Annual average GDP growth rate: 10.8%, the total value of imports and exports in 2010 reach: 2973 billion US\$
- ◆ Annual average energy consumption growth rate: 5.8%, the total energy consumption in 2010: 3.3 billion tce
- ◆ Carbon emissions reached more than 6 GtCO₂e, export has played more and more important role for the growth of carbon emissions



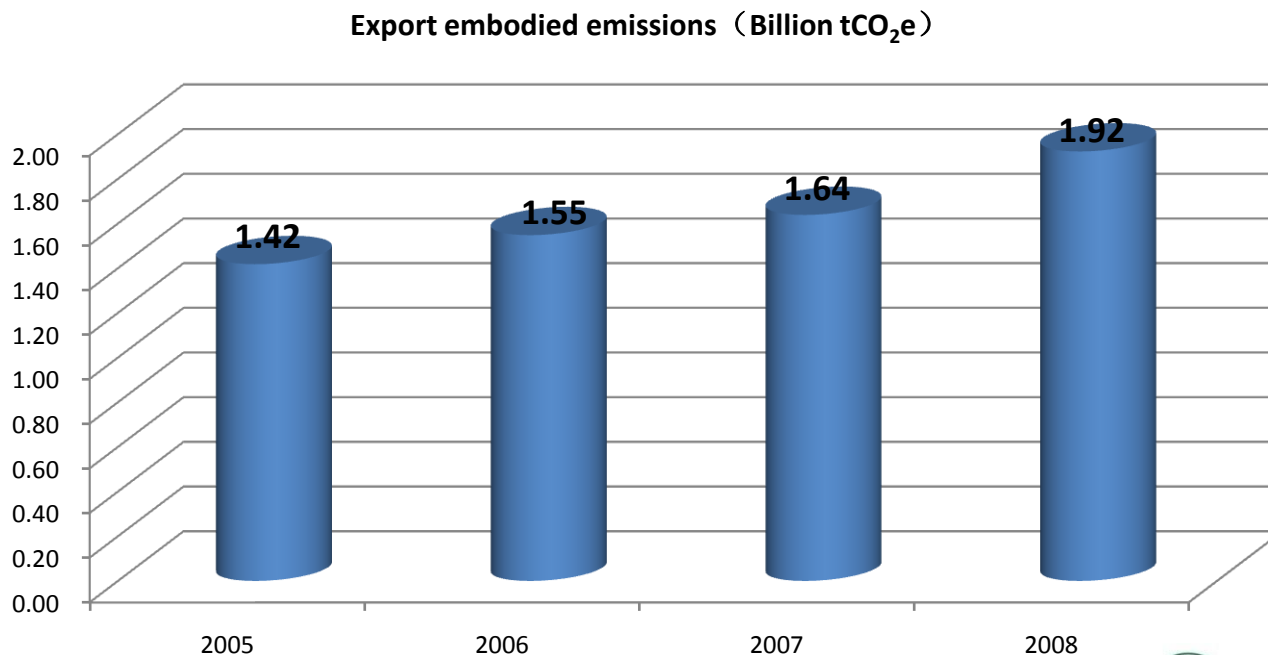
Source: Glen 2008



Source: China Statistical Abstract 2011

China export embodied emissions

- Export embodied emissions by trade for China increased from 1.42 to 1.92 billion tCO₂e during 2005-2008, accounting for 15%-27% of total emissions.
- In 2008, export embodied emissions to EU and US accounts for 33%
- The increase of the export embodied emissions are driven by the final requirements



CO₂ emission factor: 2.4 tCO₂/tce



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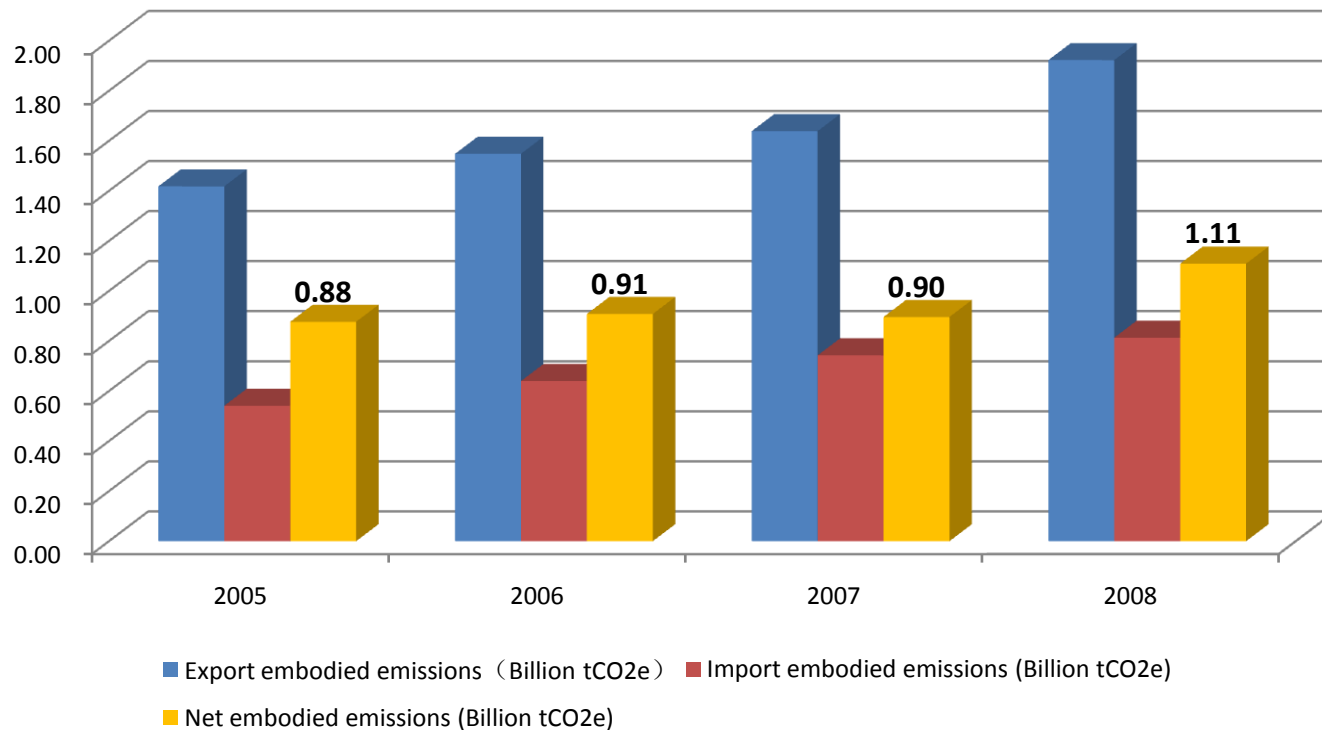
Import embodied emissions

- ◆ Make use of Japan 2000 I/O and required coefficient, calculate the annual import embodied energy
- ◆ Make the correction of Japan energy efficient by using GDP energy intensity of top 5 trade partners to solve the underestimation

(Billion tCO ₂ e)	2005	2006	2007	2008
Import embodied emissions	0.54	0.64	0.74	0.81
Total emissions	5.31	5.70	6.04	6.32
Share %	13.03%	14.05%	15.04%	15.86%

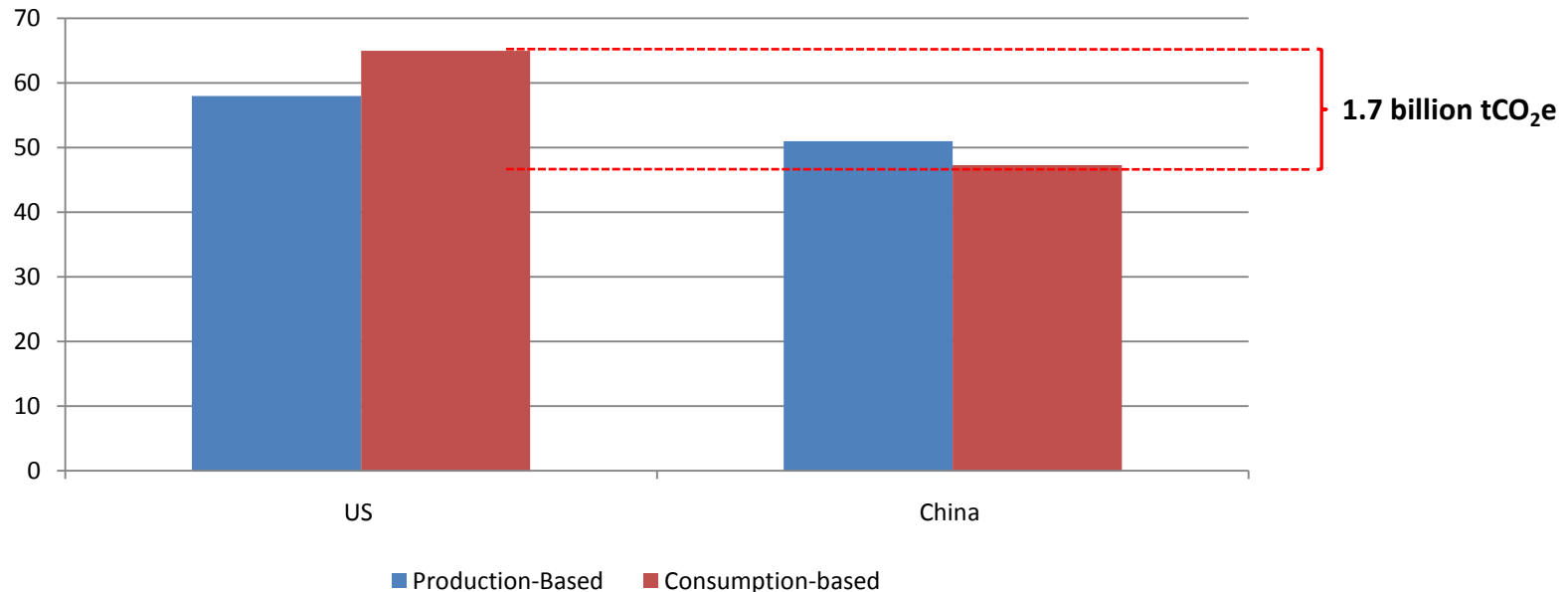
Net embodied emissions

- Net embodied emissions increased from 0.88 to 1.11 billion tCO₂e, accounts for 15%-17% of total emissions



China and US emissions

- China is close to emissions of US in 2004
- If consider the embodied emissions, for example, US emitted greater than China by 1.7 billion tCO₂e
- Final consumption pattern changes will have significant contribution to the global emission reduction



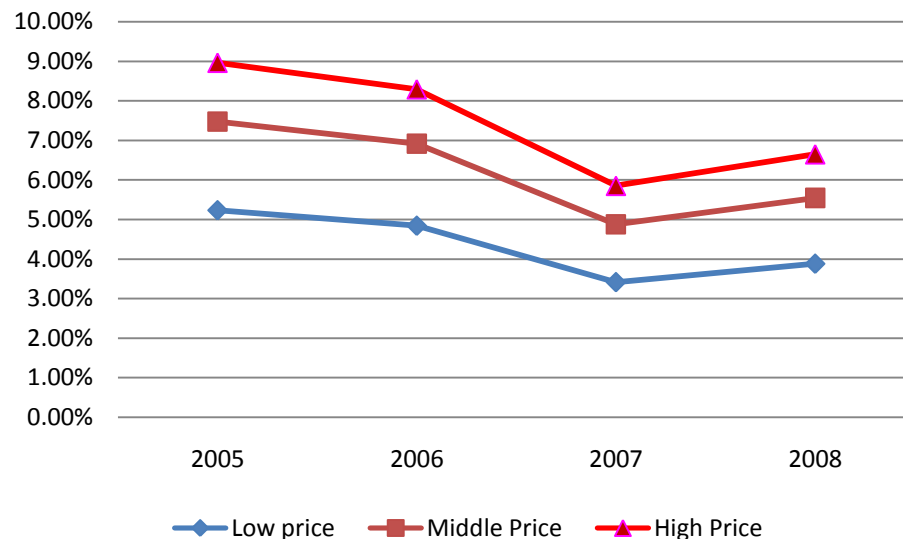
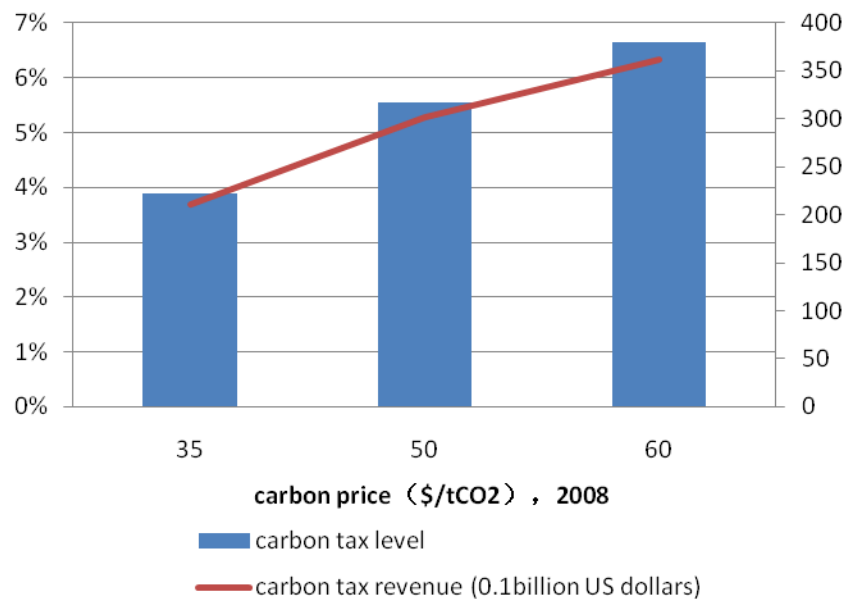
Border Carbon Adjustment (BCA)

- Climate change is economic issues, international competitiveness issues
- BCA is import fees levied by carbon-taxing countries on goods manufactured in non-carbon-taxing countries
- BCA is intended to address competitiveness concerns and carbon leakage
- One options: a border tax applied on imports into a country which has a carbon cap (for example: \$20 per tCO₂)
- There are others: Mandatory allowance purchased by importers/Carbon standards



Simulation of BCA impacts

- Three scenarios: 35, 50, 60 US\$/tCO₂
- Based on embodied emissions: export tariff rises 4%-9%
- If only goods exported to EU and US are levied, the tariff is expect to rise 2.6%-4.4%

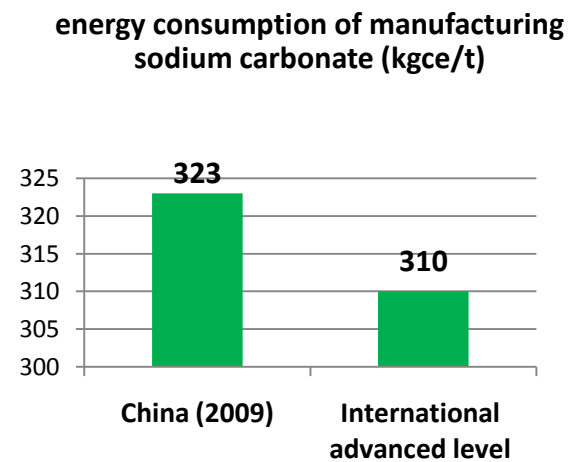
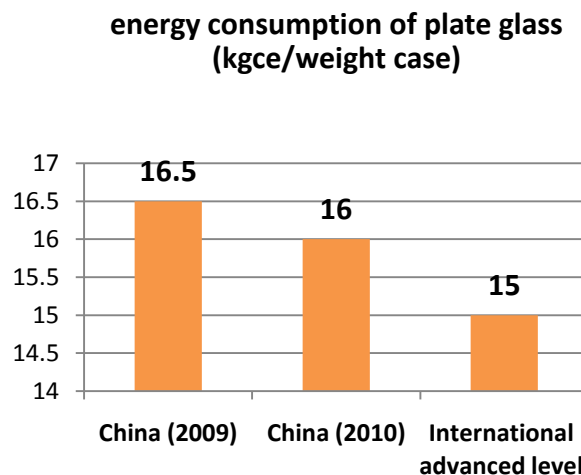
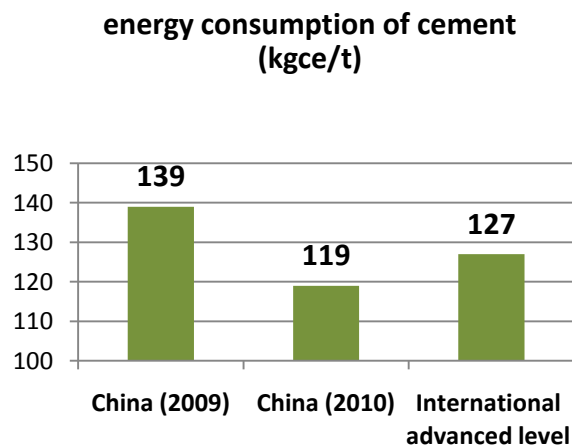
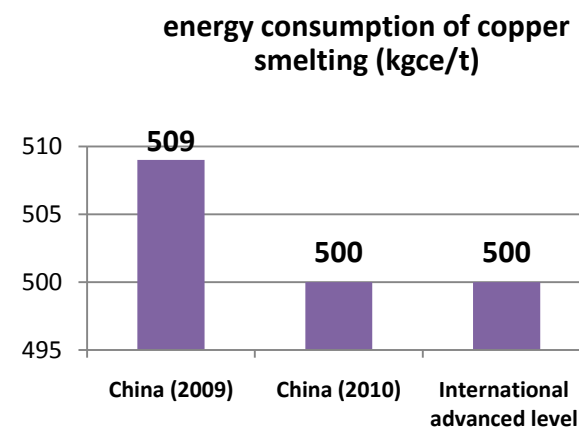
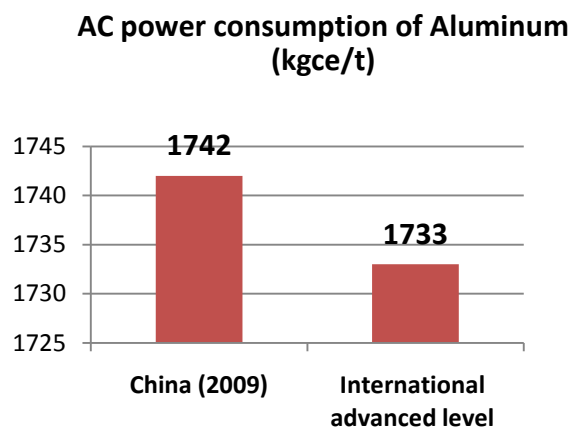
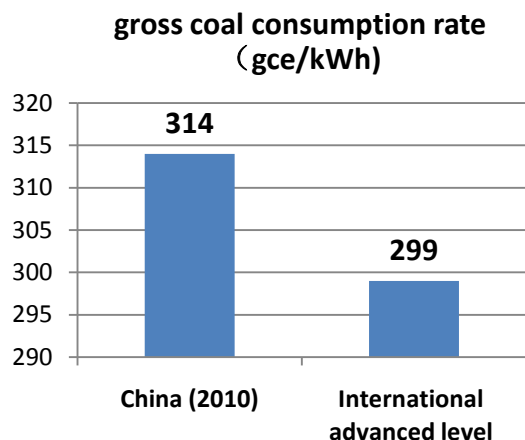


BCA Effective protect ?

- The mitigation policies are not only carbon market, carbon tax, there are also some technology standards and regulation actions
- Explicit carbon price (based on market instruments)
- Implicit carbon price (based on administrative instruments)
- BCA Effective protect: the trade policy will real play the roles and solve the carbon leakage only in the case that emissions per products of importer is lower than exporters
- In some key sector, China energy consumption of product are lower than the international advanced level



Comparison about product energy consumption of key industry



Conclusions

- Most developing countries have large net embodied emissions, China takes on the embodied emissions by 1 billion tCO₂e annually , accounts for 15%-17% of total emissions
- For global emission reduction ,the consumption pattern change will be helpful
- BCA has significant impacts on China's export, especially some energy intensive sectors, also has impacts to the developed final consumers
- BCA design will not solve its consideration and might lead to serious trade protection



Thank you for your attention!

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