

National Human Development Report 2009/10

China and a Sustainable Future Towards a Low Carbon Economy & Society

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能源与气候经济学项目
PROGRAMME OF ENERGY
& CLIMATE ECONOMICS



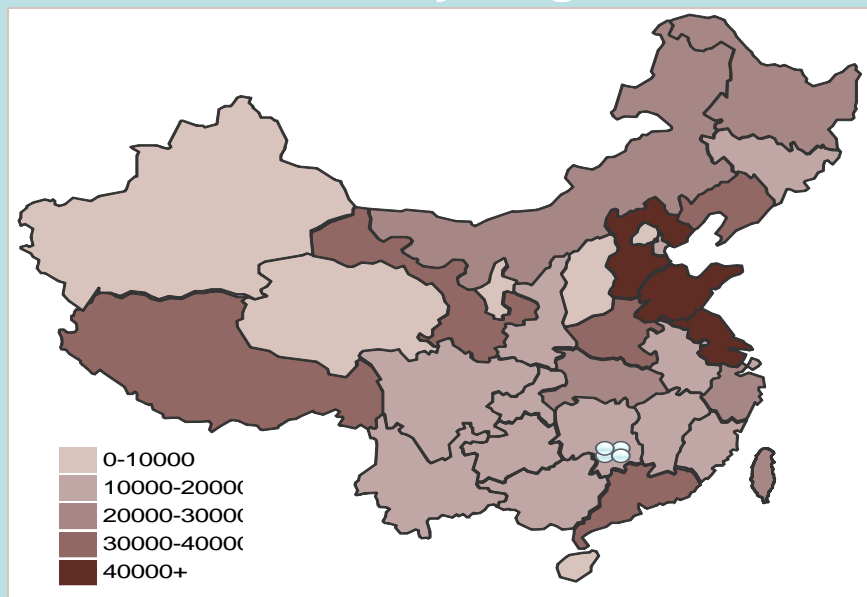
UNDP National Human Development Reports

- Human Development Reports are UNDP's flagship publications
 - Global, regional and national level reports
 - Serving as advocacy tools for informing policy-making with development-related principles and facts
- Human Development Concept
 - A theory and an approach that integrates economic, social and political development.
 - Economic growth a means, not an ultimate objective.
- Millennium Development Goals - MDG
- Human Development Index (HDI) measures basic dimensions of human life:
 - Life expectancy at birth; Adult literacy rate and combined school enrolment ratios; Real GDP per capita
- 20th anniversary of Global HDRs 2010
 - Launch on 4th November

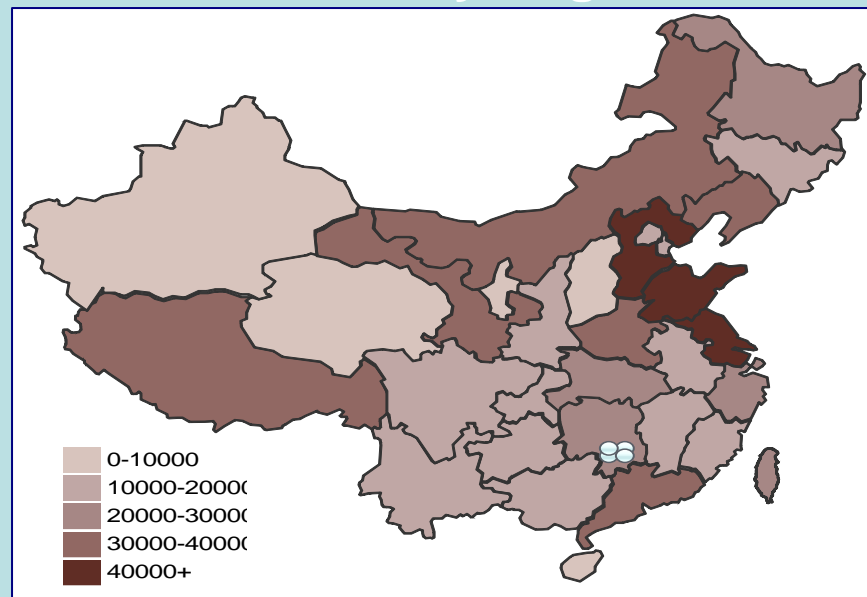
China's NHDR 2009/10

- Breaks new ground
 - links economic growth, climate change, carbon emissions and human development in China.
- Analyzes
 - the impact on China in shifting to a low carbon economy and society
 - Risks and benefits to China of low carbon development shift
- Key messages
 - Chinese development at a critical cross-road, current model of growth insufficient to the country's emerging challenges, needs
 - A gradual and smart shift to low carbon development modes is the best option for China to move forward.
 - There is a need to decouple human development from high growth rates and to make growth more oriented around quality and efficiency.
- **The Report asks: what will it take for China to adopt a low carbon path to development?**

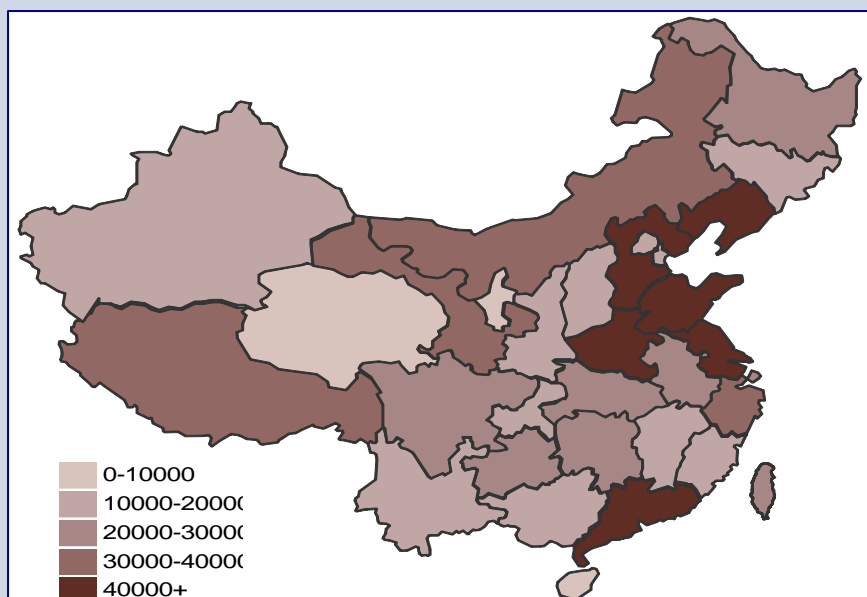
CO2 Emissions by Region in 2005



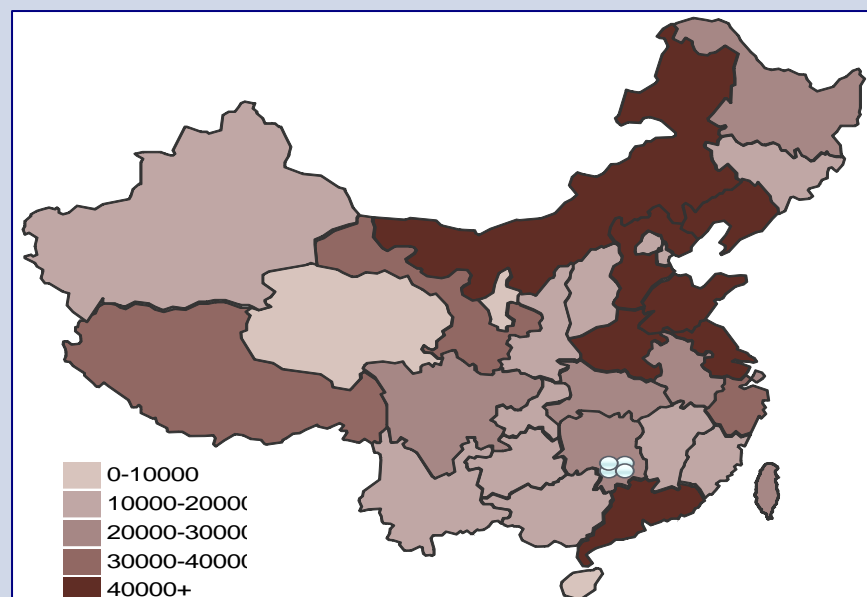
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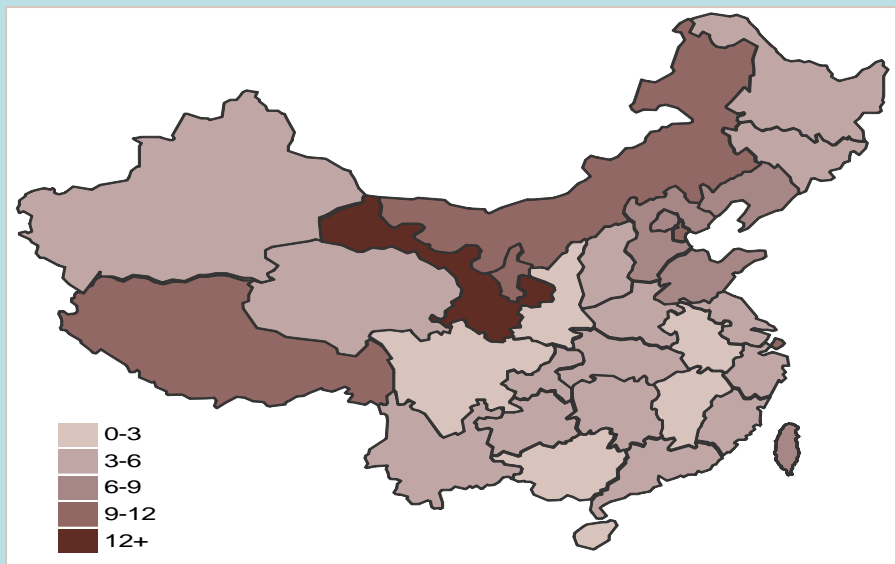
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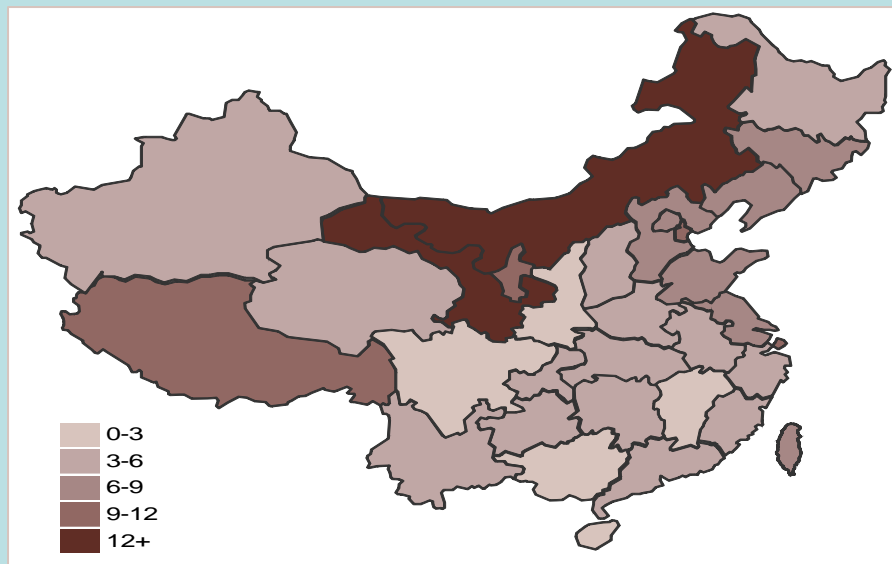
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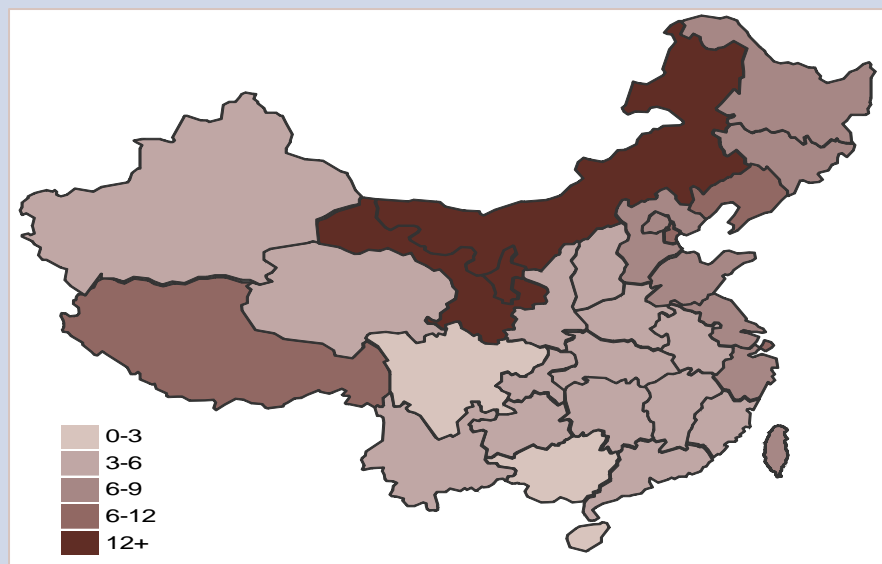
**CO2 Emissions Per Capita by Region
in 2005**



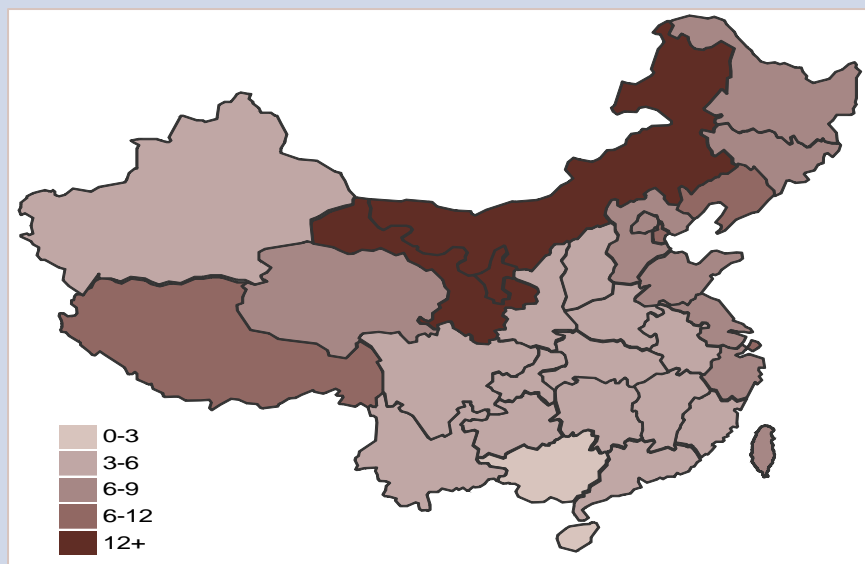
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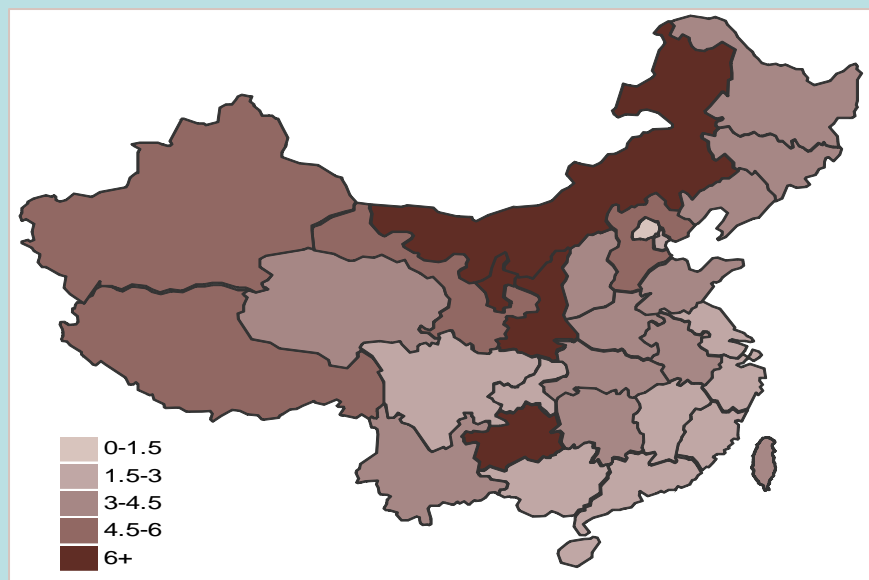
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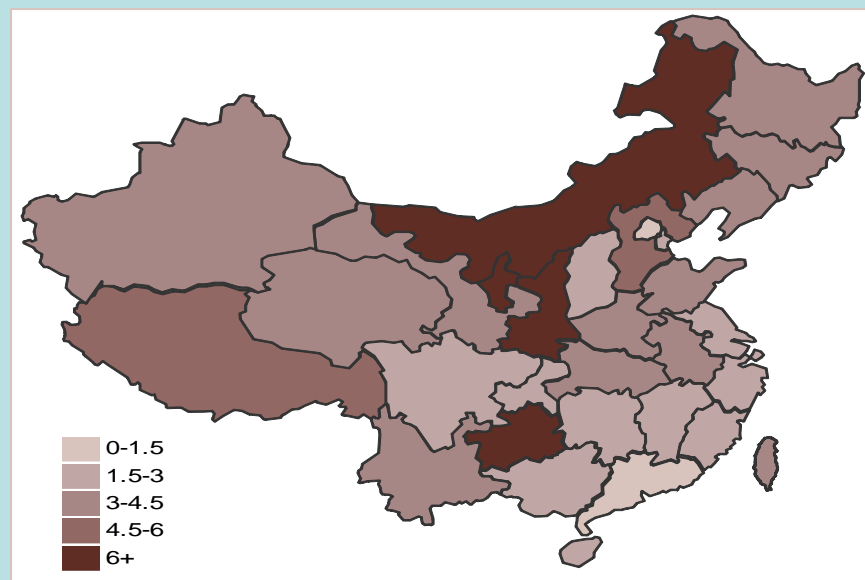
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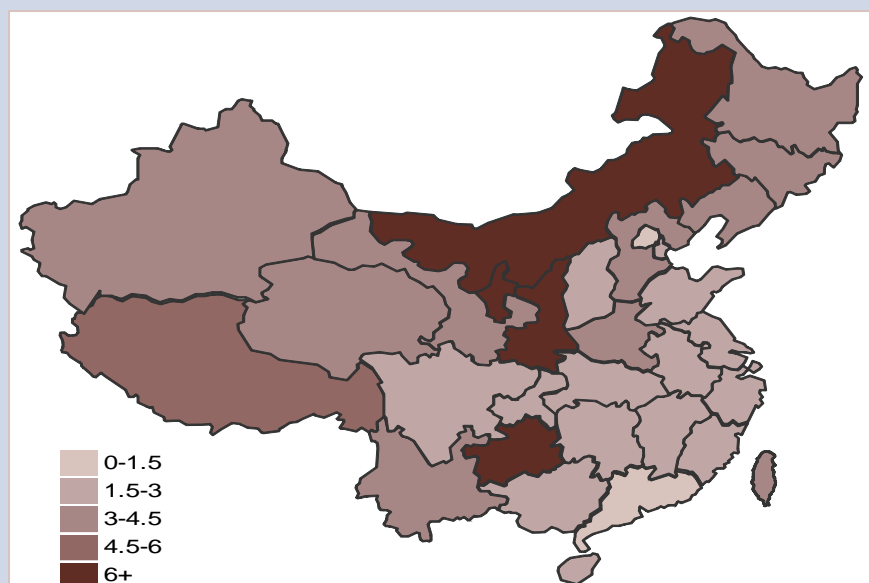
Carbon Intensity by Region in 2005



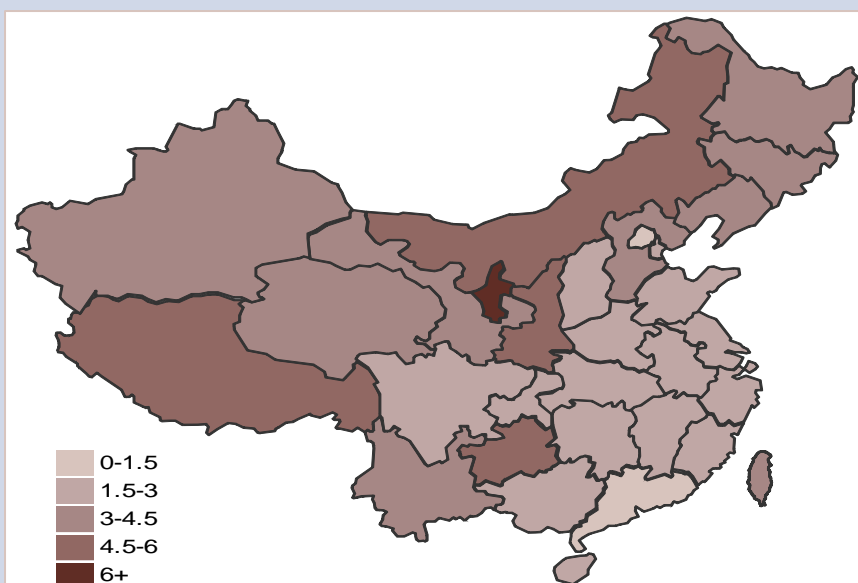
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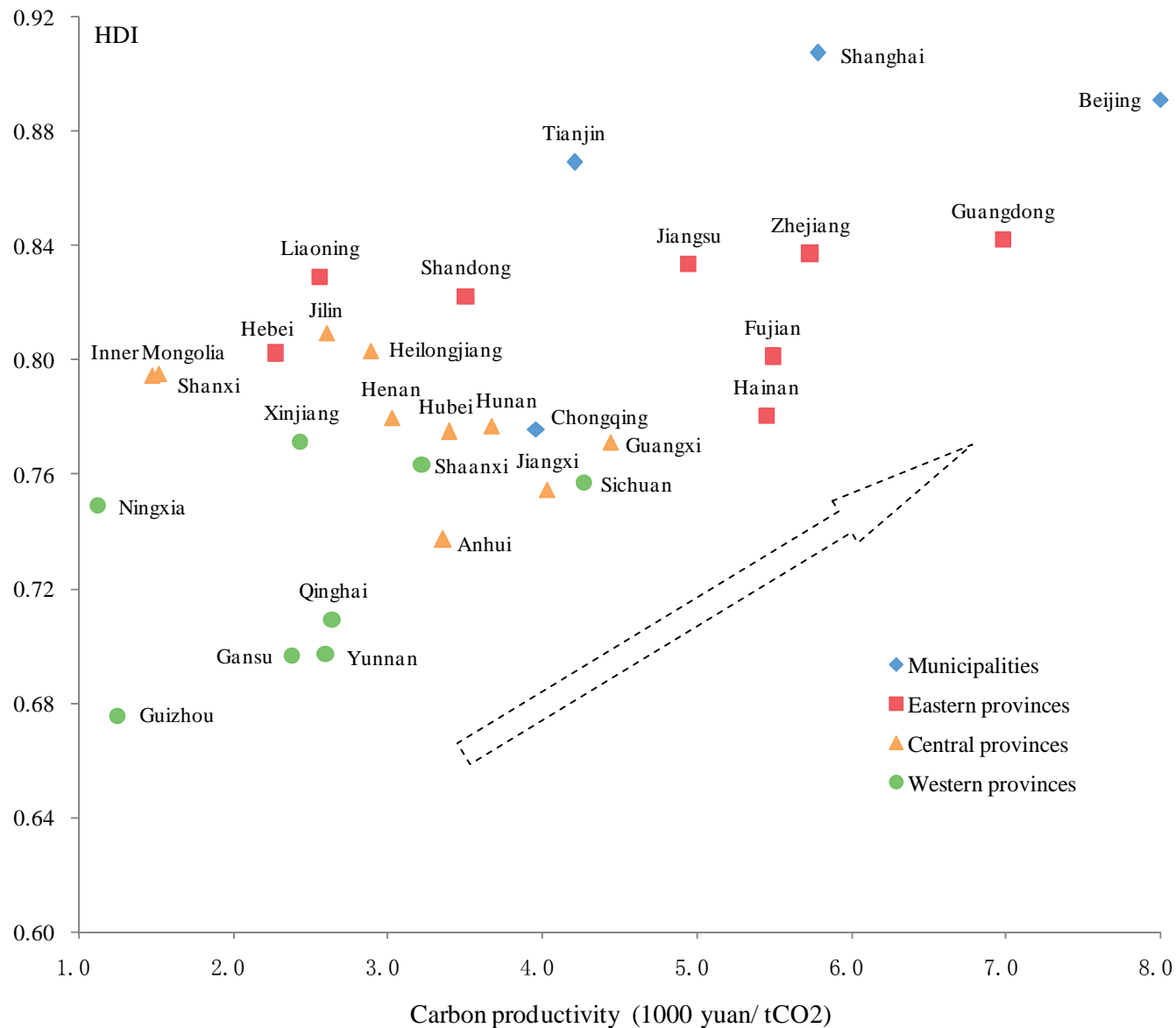
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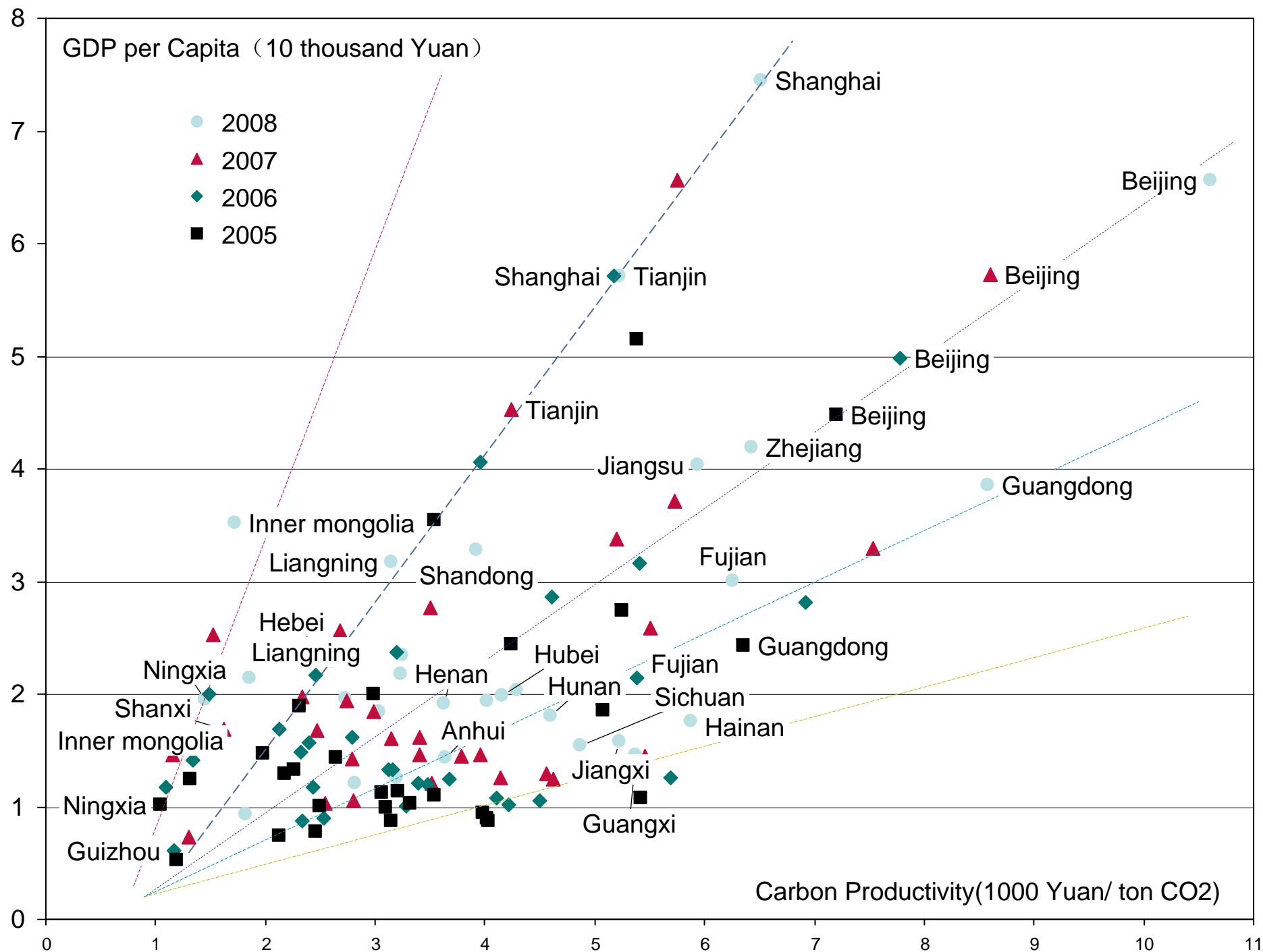
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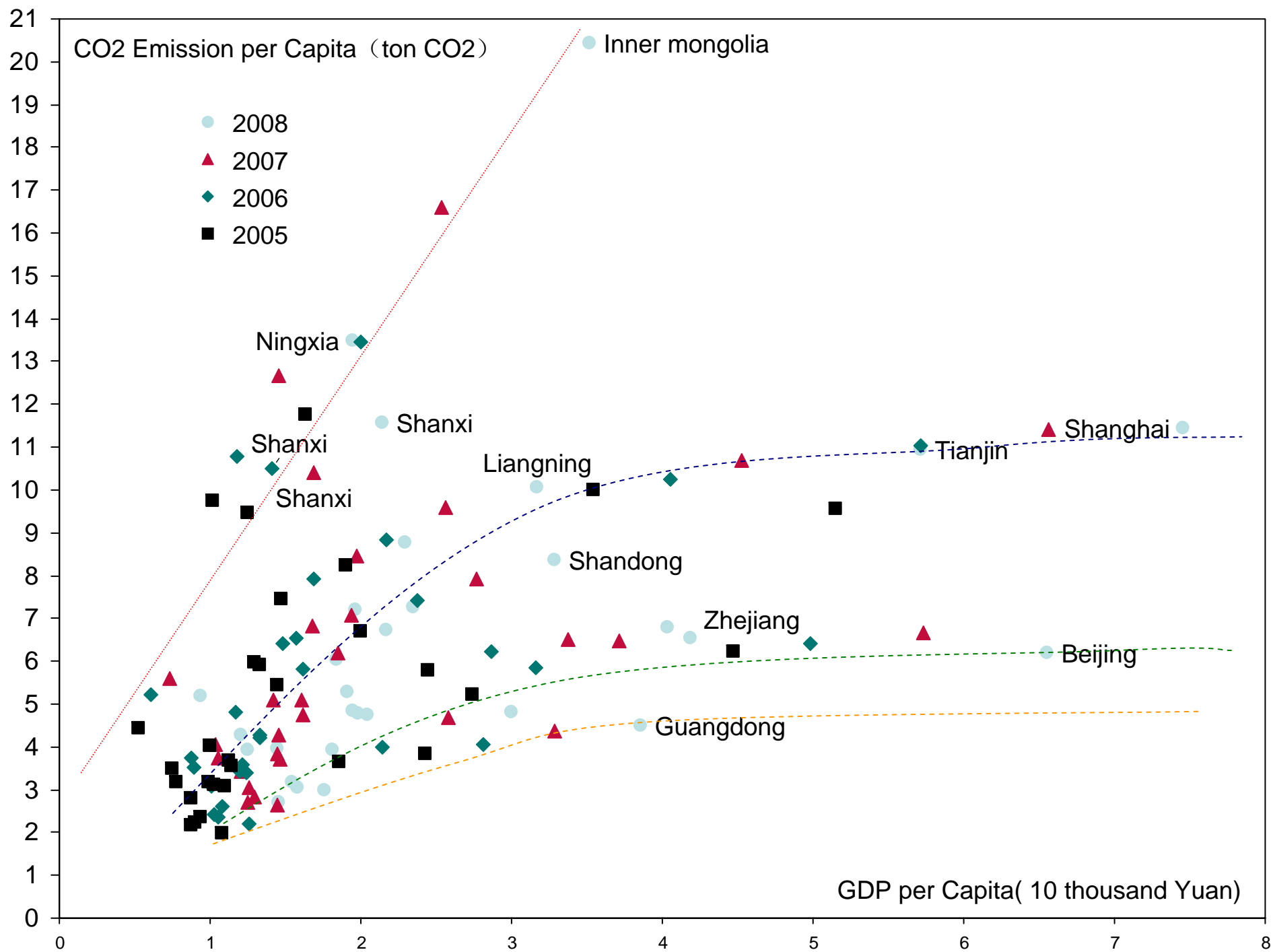


Provincial level carbon productivity and HDI



Source: China Statistical Yearbook 2008, adapted by Taskforce on NHDR 2009-2010, Renmin University of China. Note: Data on Tibet were unavailable.





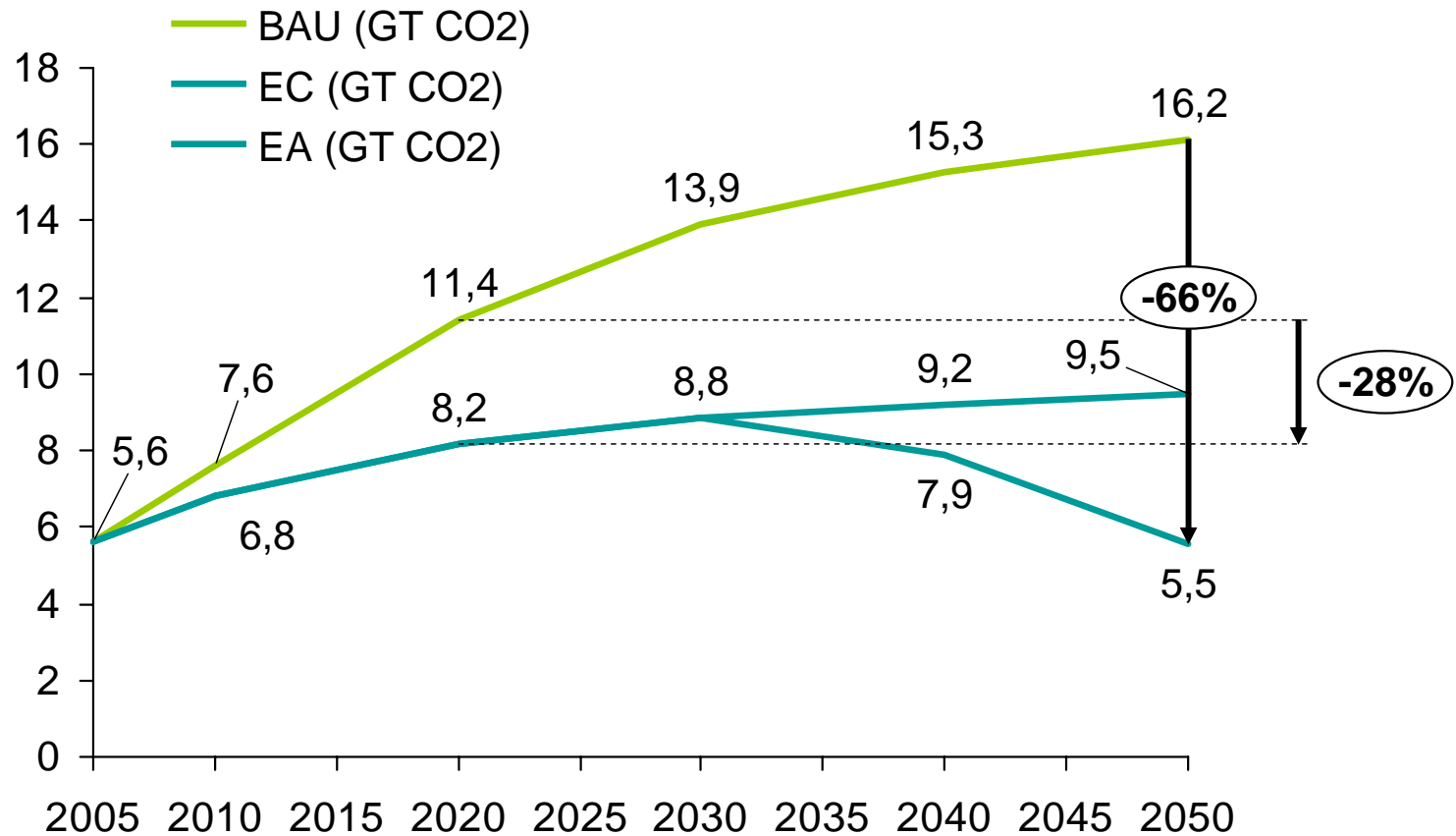
Technology needs to play key role in developing LCES

- Need to explore opportunities and measure costs and co-benefits.
- Technology roadmap and needs assessment is key to identify where greatest opportunities are.
- Technology choices will influence the extent to which China follows a Business As Usual, Emissions Control or Emissions Abatement pathway.
- Investing in and deploying advanced technologies now could avoid lock-in effects in the energy sector and infrastructure.

Technological roadmap towards low carbon economy (LCES)

- Integration of socioeconomic development, energy security, and technological change.
- Comprehensive policy messages: emission targets, incremental investment, costs, and policy & measures.
- Based on modeling exercise and currently available information and knowledge.

CO₂ Emission Scenario



Carbon intensity

■ Cabon Emission Intensity Under EC, kg CO2/\$,2005price
■ Cabon Emission Intensity Under EA, kg CO2/\$,2005price

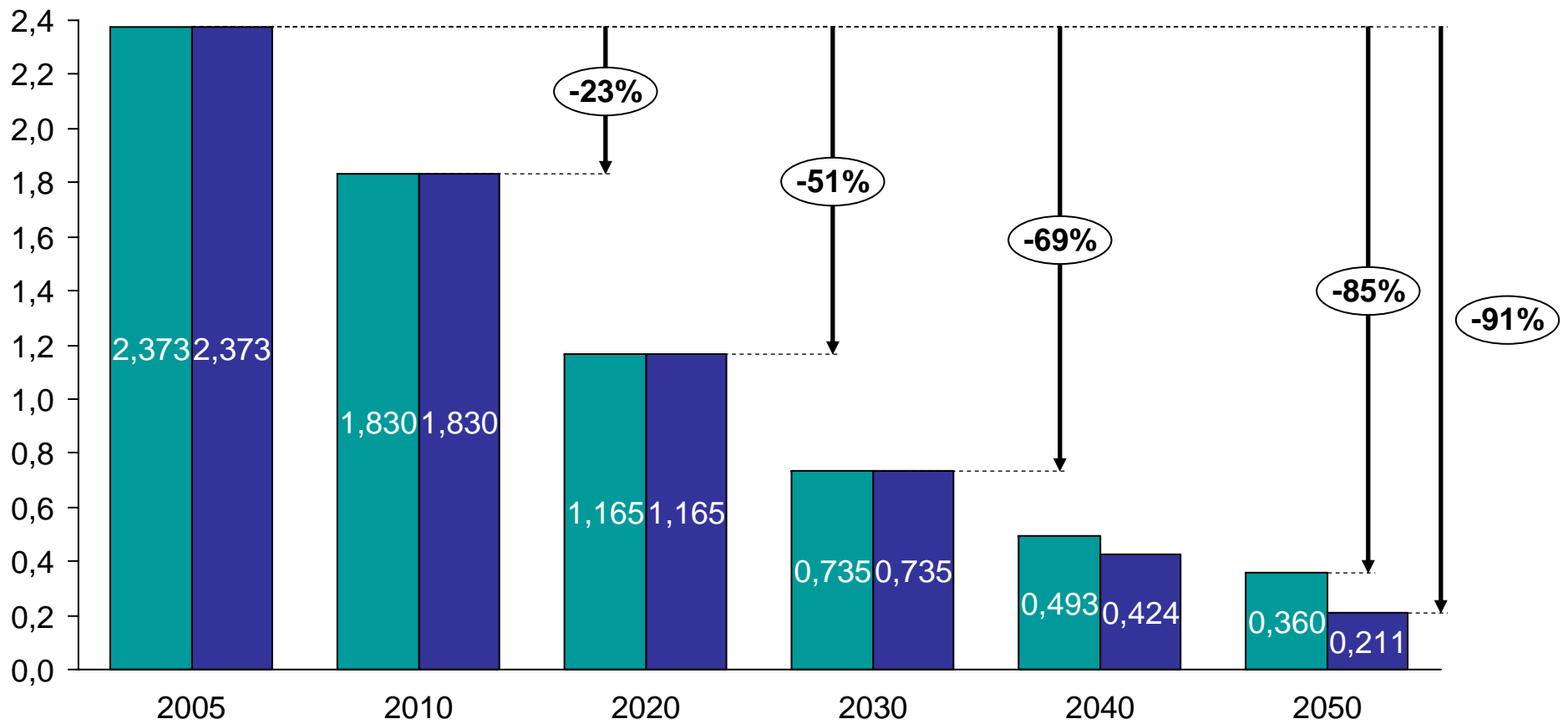
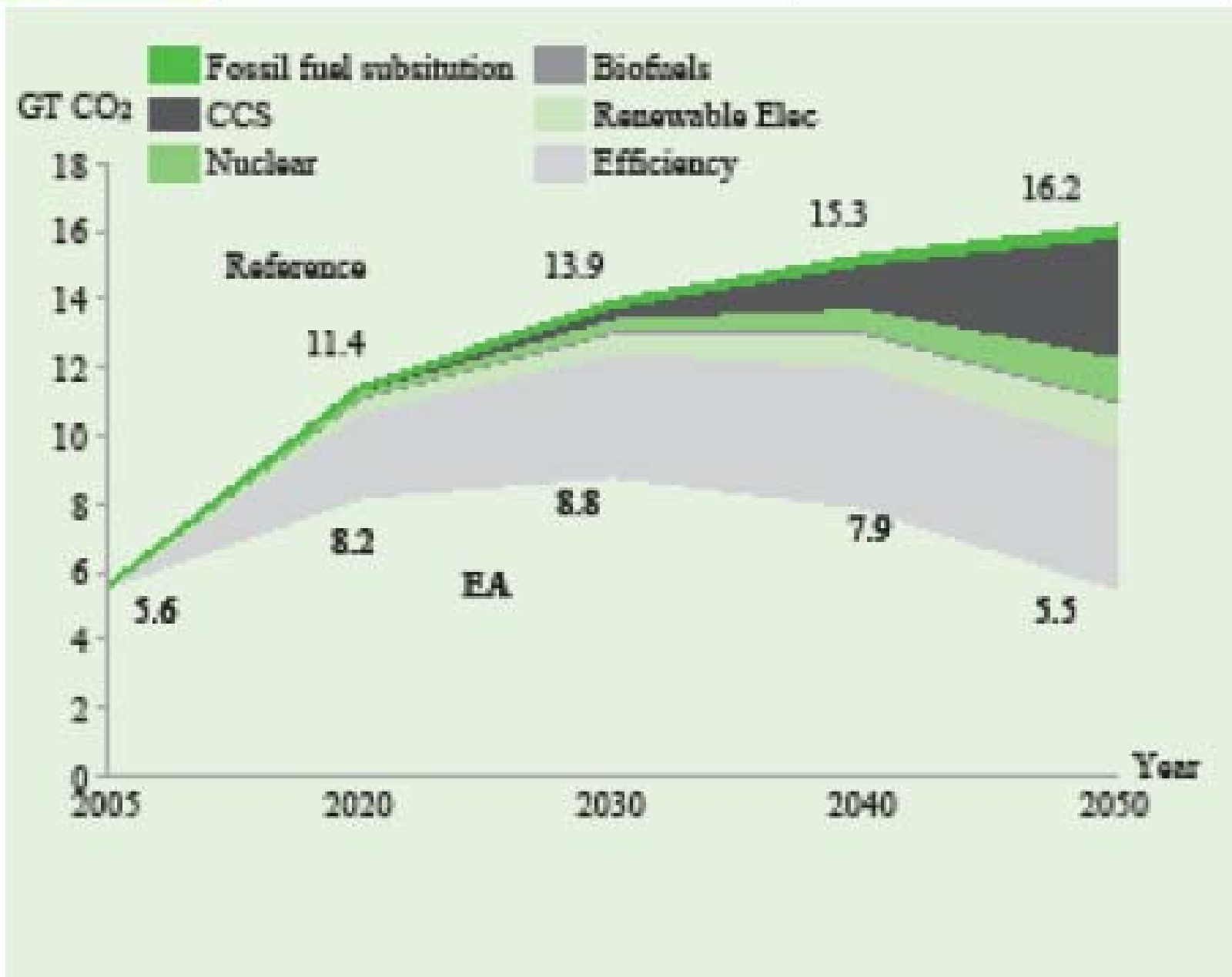


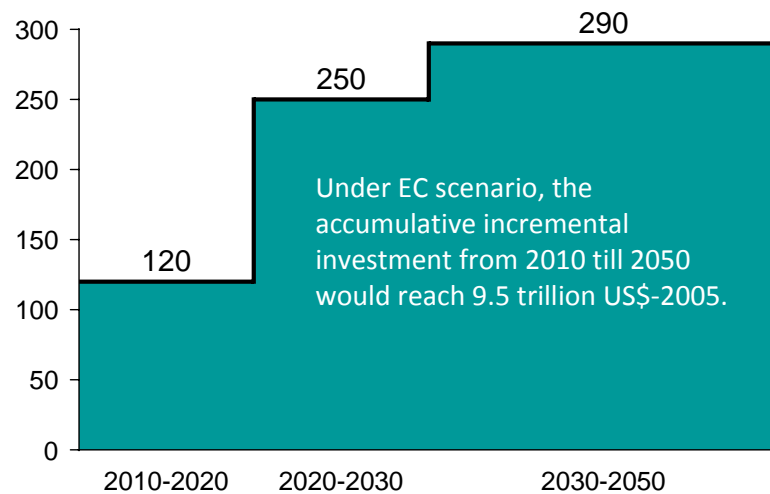
Figure 3.4**Sector-wise emission reduction potential**

Key Technology Needs

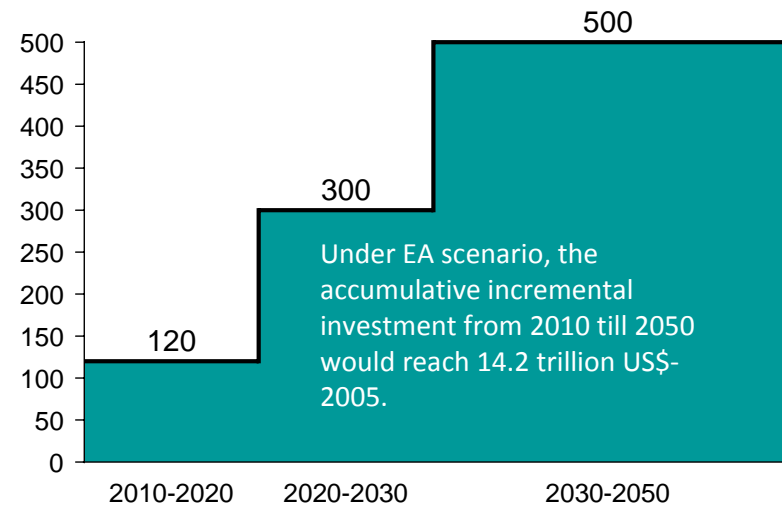
	Deployment & Diffusion (Near term)	Demonstration (Mid-term)	R&D (long term)
Power	USC; On-shore Wind power technology; 3rd generation large-scale Advanced pressurized water reactor; Geothermal- Conventional; High-efficiency natural gas fired power generation;	Coal Integrated Gasification Combined Cycle (IGCC); Off shore wind power; Solar Photovoltaic; Geothermal–Enhanced; 2nd Biomass;	Low cost CO2 capture and storage; Nuclear fusion; CSP; Power storage; Smart grid; 4th nuclear generation; Solar nanotechnology photovoltaic; Hydrogen production, storage and distribution; Fuel Cell
Steel	CDQ; CCPP; CMC; Power, heat and fuel recovery; Coal Injection of Blast Furnace; Energy management center;	COREX; FINEX; Advance EF; Smelting reduction technology; Waste Plastic Injection; Direct Casting;	CO2 capture and storage;
Transport	Enhance fuel economy of vehicles by improved engine/ transmission/ matching technology; Develop advanced diesel vehicles; Improve railway electrification; Aviate fuel economy management;	Hybrid vehicles; Enhance fuel economy of transport system by information & intelligent systems Improved road network;	Fuel cell vehicles; Electric-motor vehicles; Optimizing the construction and integration of transport capacity;
Cement	NSP cement kiln technology, especially the automatic control device and the overall operation level; Low-temperature cogeneration technology;	Eco-cement Alternative fuels and cement clinkers;	CCS;
Chemical	New type catalyst; Large-scaled Synthetic Ammonia equipment; Optimize structure of raw material for Ethylene;	Alternative fuels and raw materials;	CCS;
Buildings	Green Lighting; Technologies and materials of heat-insulation of external walls and roofs; Advanced efficiency electric devices ;	District energy system; Heat pump system; supervising and Monitoring of building energy consumption technologies; Heat-electricity-coal gas triple co-supply system	Energy storage technology ; Zero-emission buildings Building integrated photovoltaic solar power system; Advanced city plan;

Incremental investment

■ Annual incremental investment under EC, billion US\$-2005



■ Annual incremental investment under EA, billion US\$-2005



Incremental cost

	Incremental cost under EC			Incremental cost under EA		
	2020	2030	2050	2020	2030	2050
Emission per capita t-CO ₂	5.6	5.8	6.3	5.6	5.8	3.7
Emission intensity reduction (compared with 2005 level)	51	69	85	51	69	91
Emission reduction Gt-CO ₂	3.2	5.1	6.7	3.2	5.1	10.7
Incremental cost (billion	86	269	523	86	269	1584
Reduction cost(US\$-2005/t CO ₂)	27	56	78	27	56	148
Percent of GDP (%)	1.2%	2.2%	2%	1.2%	2.2%	6%
Cost of per household (US\$-2005/ year)	182	538	1006	182	538	3046

Co-benefits of LCES

- Poverty alleviation
- Green job
- Improvement of local environmental quality and resources security
- Public health, and
- Future comparativeness along with technological advance

Challenges to achieve LCES

- Specific development stage with high carbon intensity and urbanization and industrialization process
- Energy endowment: coal domination
- Endogenous capacity for technological design and innovation
- Huge population with need for employment and social security

Policy Roadmap: towards effectiveness and efficiency

Step 1.

- Plan and national target: allocate the national target into enterprises via (in a view to redefine stakeholder's responsibility and improve efficiency by market-based instruments)
 - Highly concentrative sectors (immediately, e.g., power, petrochemical, etc)
 - Competitive sectors (with a transition period, e.g. cement metals, etc)
 - Local governments (immediately, e.g., urban transport, housing, etc)
- Capacity building and policy infrastructure: monitoring, carbon accounting, enforcement and awareness;
- Development of standards and codes as basis of economic instruments of policies;

Step 2

- Short term: step-by-step integrated fiscal reform by introduction to comprehensive environmental tax while reducing employment tax in a view to adjust factor pricing together with transfer of payment; and

Step 3

- Medium and long term: building up cap-and-trade system



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Thank you for your attention

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