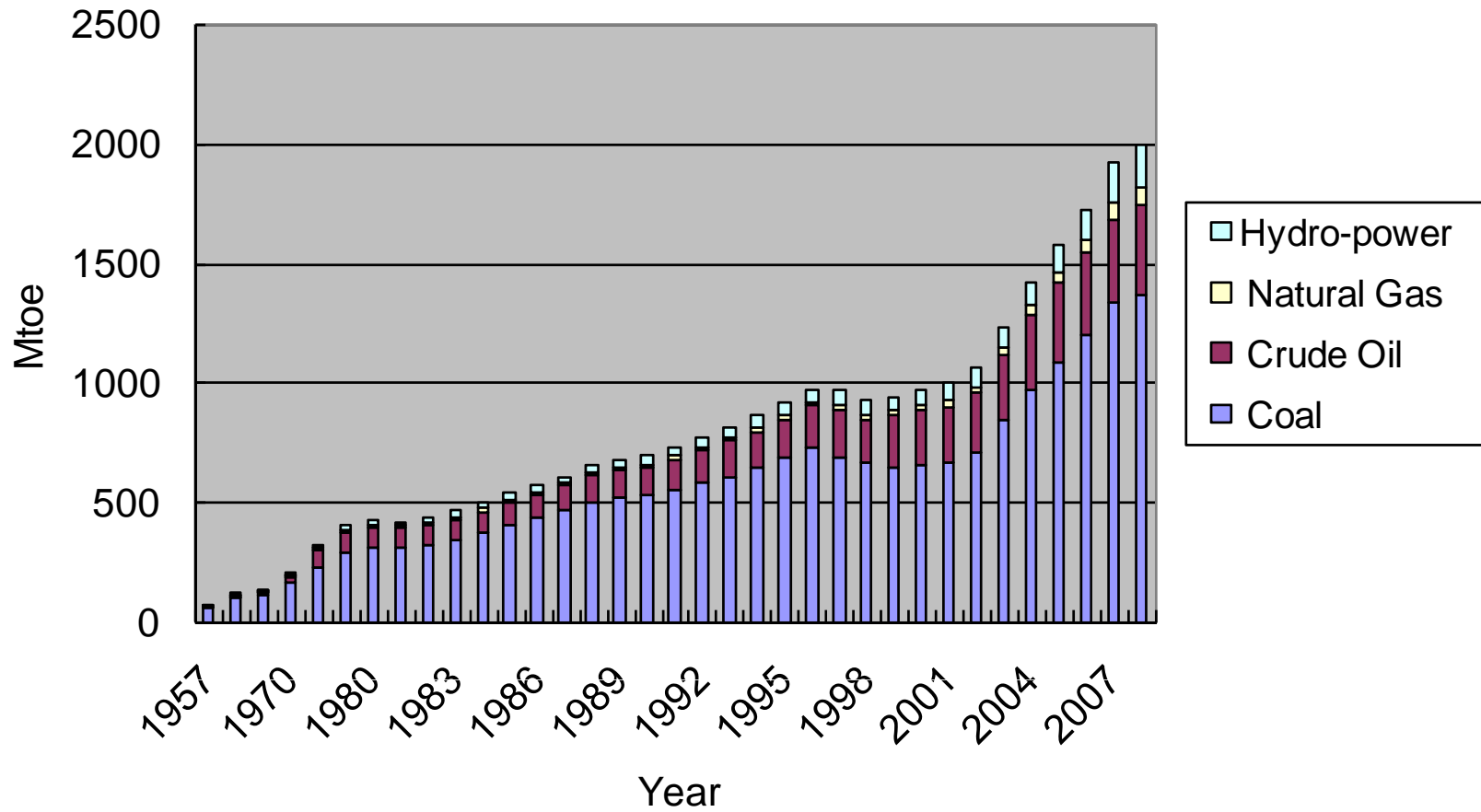


# How to use modelling tools to answer questions on policy making in China

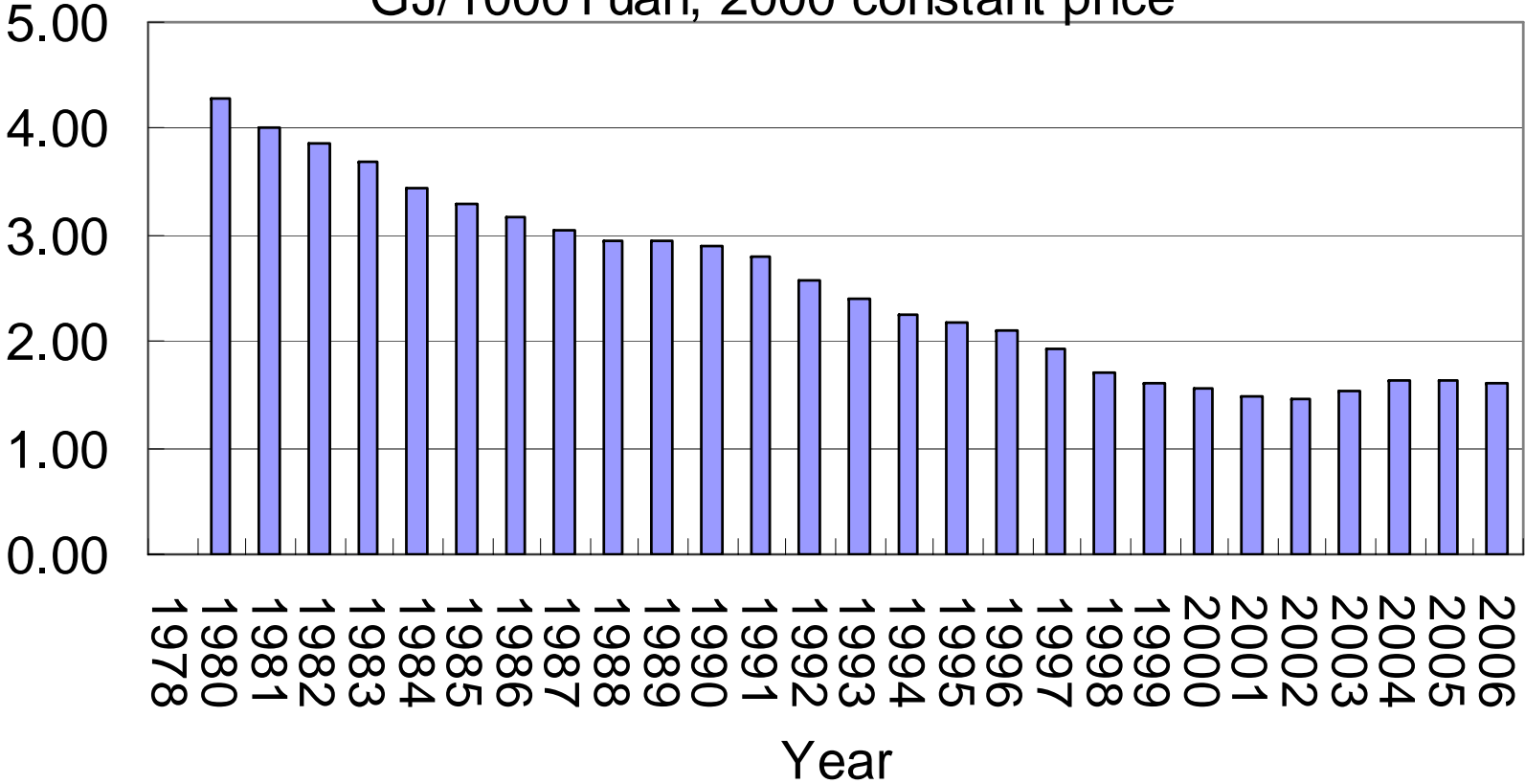
Kejun JIANG  
Kjiang@eri.org.cn

Energy Research Institute, China

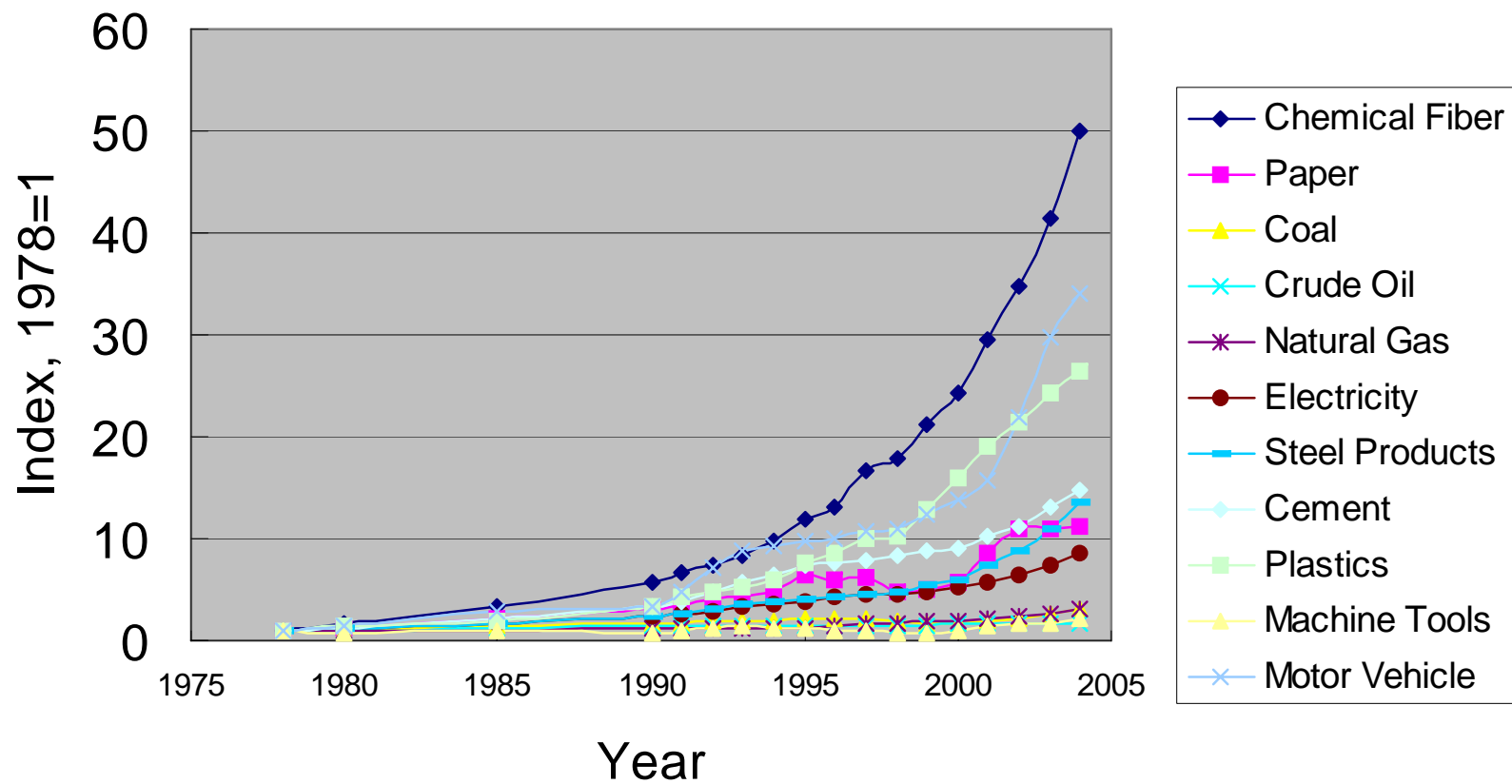
Energy consumption by fuels(1957-2008)



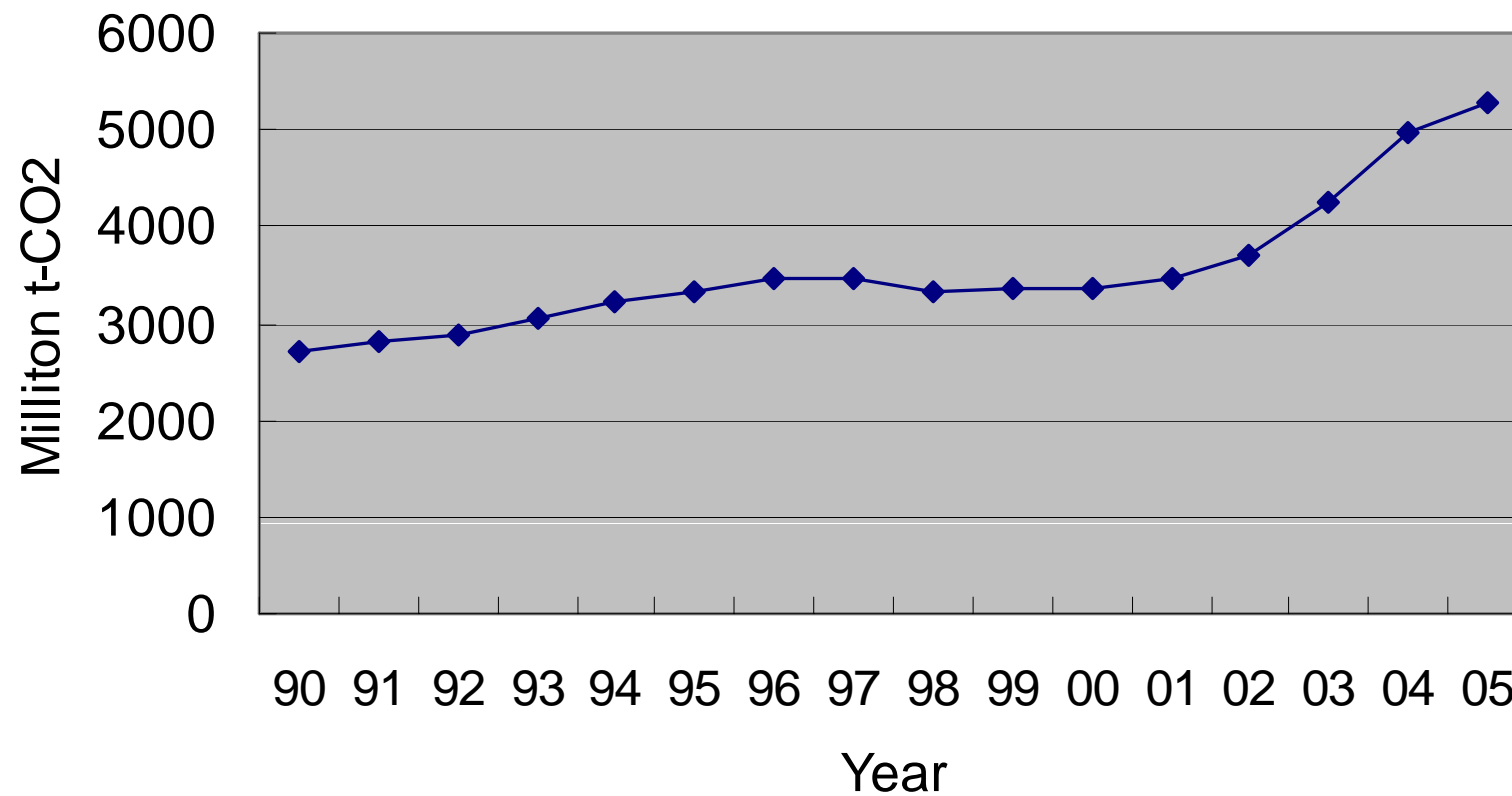
Energy Consumption per unit of GDP  
GJ/1000Yuan, 2000 constant price



### Index of industry products in China, 1975-2004



CO2 Emission in China, 1990-2005



## *What is happening now on policy*

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- Negotiation in COPs, Copenhagen and after that
- 12th Five Year Plan on Energy, Climate change
- Low Carbon Development Planning and Strategy
- National long-term energy plan

Table 4. Major policies announced recently

Classification	Policies
Administration	Establishing energy conservation and emission reduction steering group chaired by Prime Minister (June 2006); Distributing targets to each province (September 2006)
Overall National Policies	Synthesizing Working Program for Energy Conservation and Emission Reduction (June 2007); Revised Energy Conservation Law (October 2007); Integrated Resource Utilization Guidance (January 2007); Guidance for Accelerating Energy Conservation Service Industry (2008); Guidance Catalog for industry structure change (annual)
Monitoring	Implementation Program of Energy Intensity Per GDP Statistic Index System (Nov. 2007), Implementation Program of Unit Energy Use Per GDP Exam (Nov. 2007), Implementation Program of Unit Energy Use Per GDP Monitoring (Nov. 2007)
Pricing/Financing	Differentiating energy prices for key energy-intensive industries
Standardization	Second catalog of energy efficiency labeling for consumer products (Sep. 2006); Third catalog of energy efficiency labeling for consumer products (January 2008)
Industry	1000 large energy users monitoring program by national government (April 2006); extending provincial large energy user monitoring program (April 2006); closure of small-size industry in energy intensive sectors including cement, steel, non-ferrous, chemistry etc. (June 2006); approval for new projects based on energy efficiency standard (January 2007)
Transport	Light Vehicle Fuel Efficiency Standard (Sep. 2007)
Buildings	11 <sup>th</sup> Five Year Plan for Energy Conservation in Buildings (February 2006); Building Efficiency Standard Implementation (June 2007)
Power generation	Closure of small power plants (January 2007), regulation for newly installed coal-fired power plants to be most advanced power plants

## *Negotiation*

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- Targets? By 2020, 2030 or 2050? Intensity or absolute targets?
- Commitment: domestic targets or actions, MRV, sector based approach
- Cost and benefit?
- Technology transfer needs?

## *Domestic climate change strategy*

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- What is the targets of GHG in China? Short-term and long-term?
- Key policies and countermeasures for low carbon future
- Long-term Energy and emission pathways?
- Economy development pattern?
- Technology R&D strategy? What kind of technologies?
- Near-term action and policies? Cost and benefit of these near-term policies?

## *Using modeling tools*

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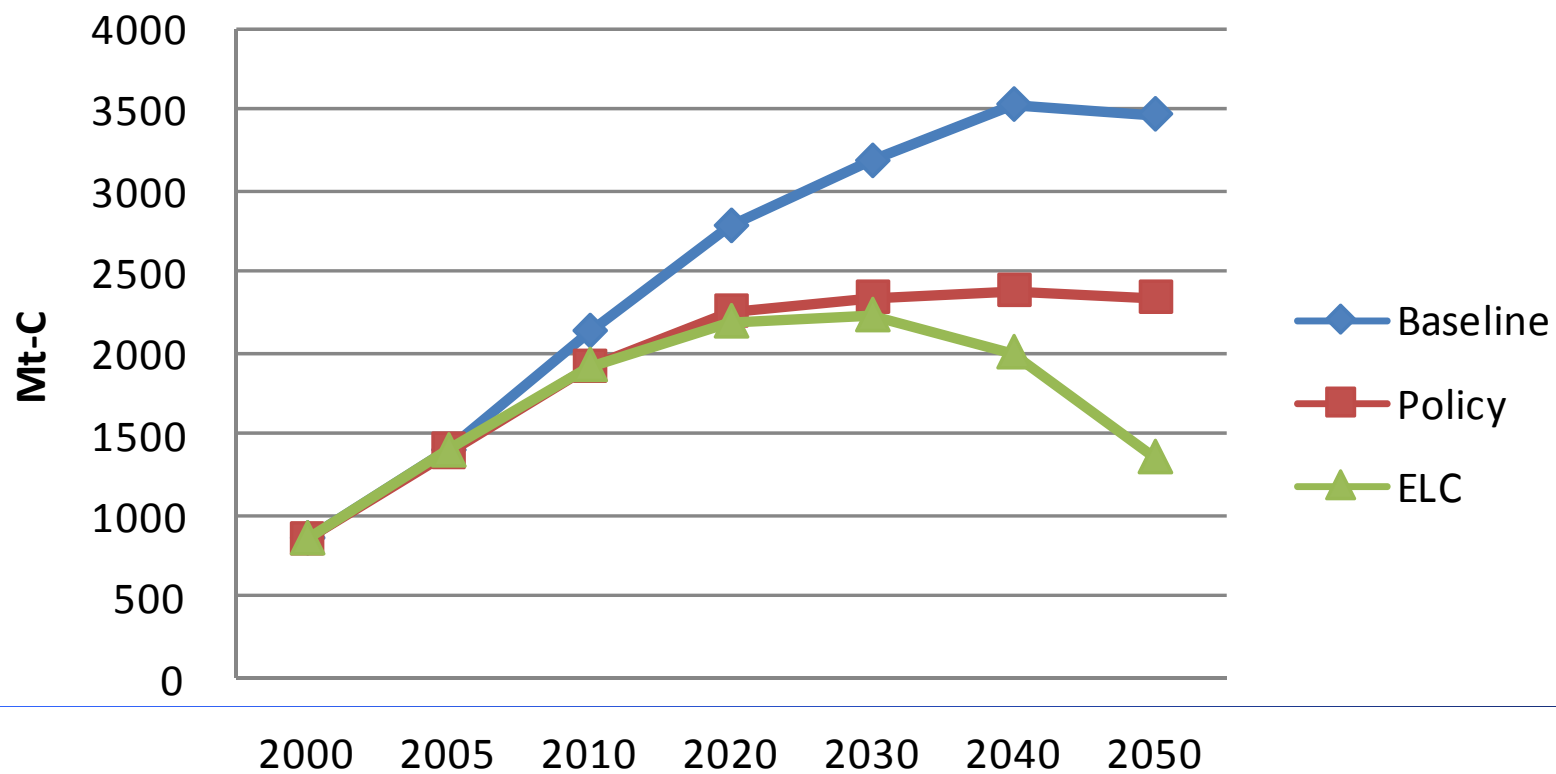
- Scenarios: pathways, targets (intensity and absolute)
- Cost analysis: wide range of cost analysis
- Multi-development targets analysis
- Benefit analysis by taking low carbon economy
- Co-benefit analysis (GHGs, local pollutions, water pollutions, and others)
- Integrated analysis

## *What we are doing*

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- Low carbon scenario up to 2050 for China
- Technology roadmap up to 2050
- Policy roadmap for deep cut in 2050
- Political roadmap for Climate change in China and the world
- Low carbon development for cities and provinces (more than 10 cities and provinces)
- Cost and benefit analysis
- Technology solution

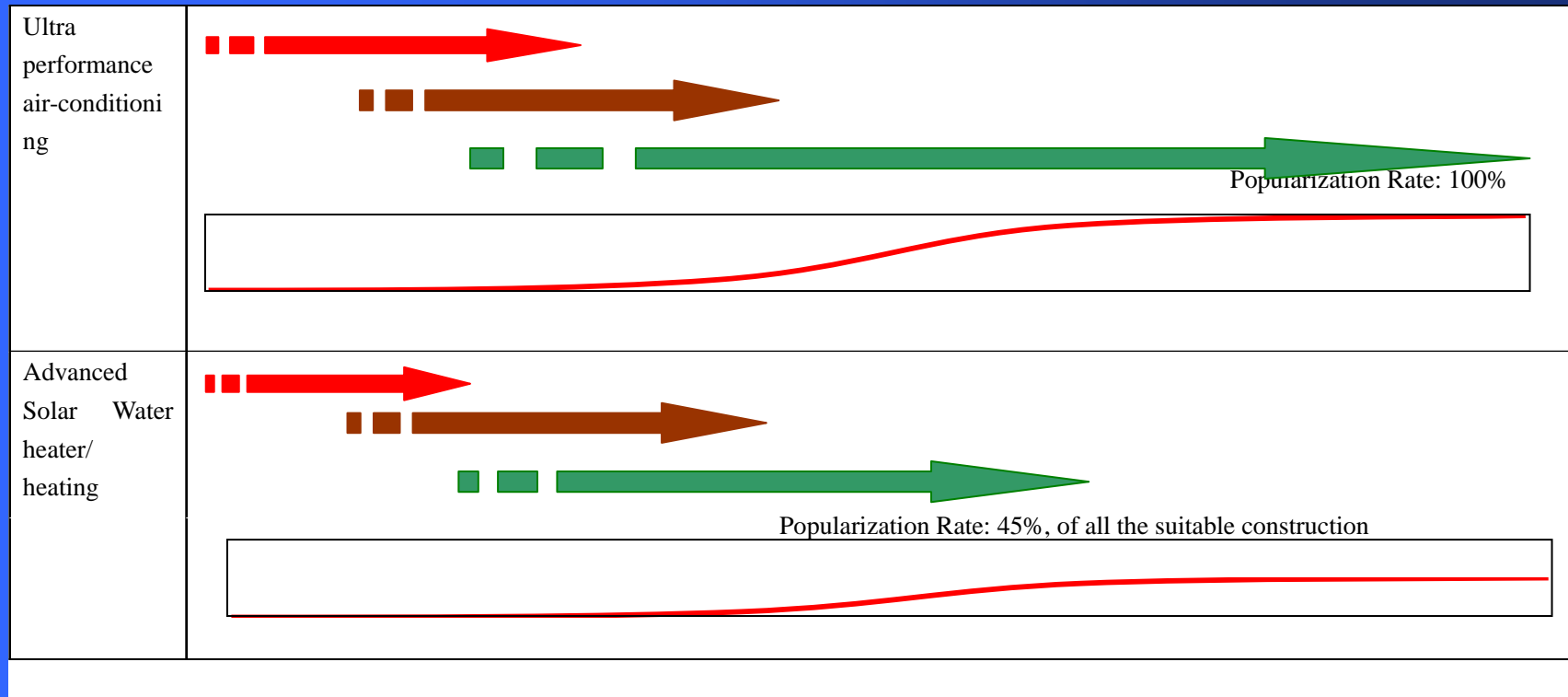
# CO2 Emission in China



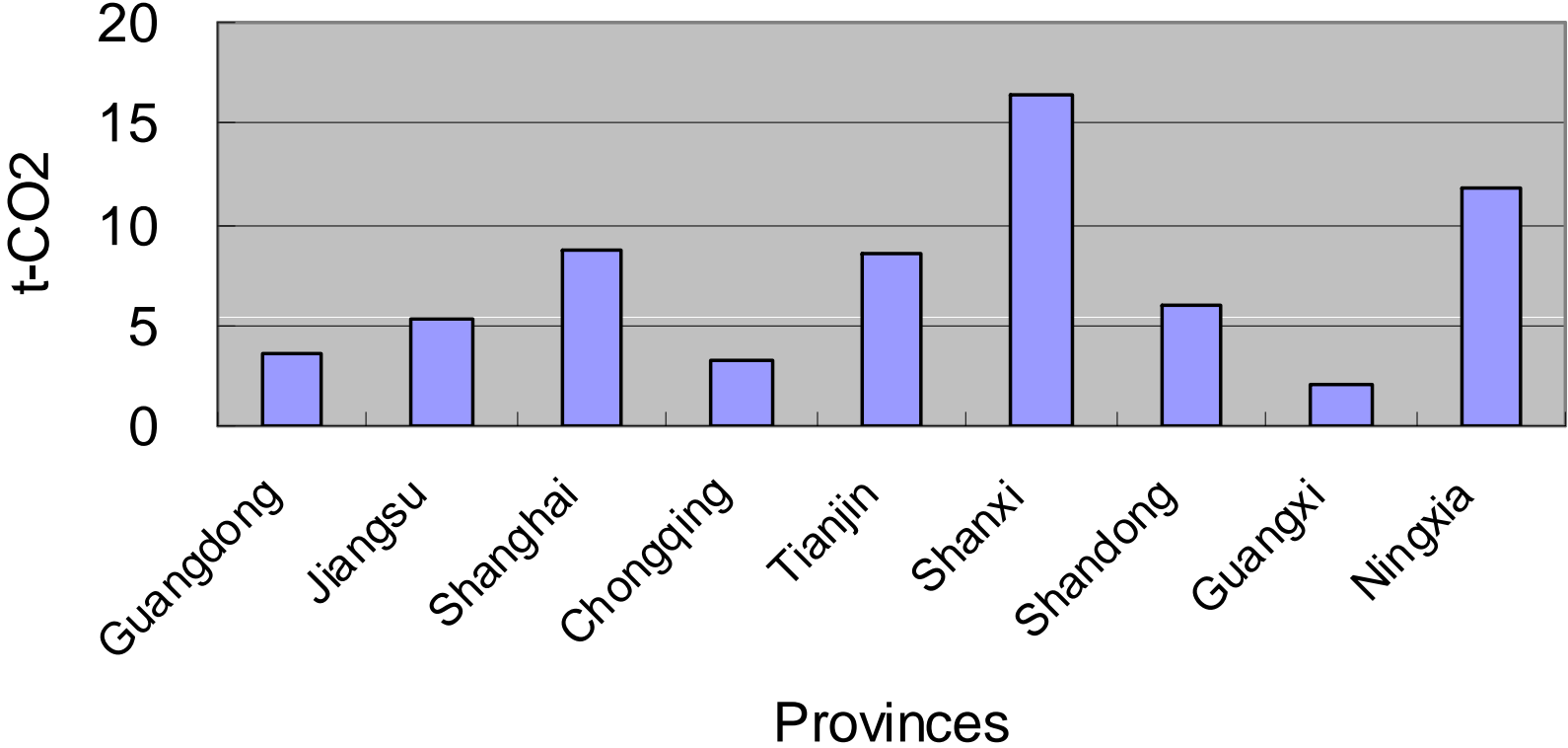
## 28 key technologies in the enhanced low carbon scenario in China

No.	Sector	Technology	Description	Note
1	Industry technology	High energy efficiency equipment	High efficiency furnace, kiln, waste heat recovery system, high efficiency process technologies, advanced electric motor	Nearly in market
2		New manufacture process technology for cement and steel		
3		CCS	In cement, steel making, refinery, ethylene manufacture	
4	Transport	Super high efficiency diesel vehicle	Advanced diesel hybrid engine	
5		Electric car		
6		Fuel cell car		
7		High efficiency aircraft	30% higher energy efficiency	
8		Bio-fuel aircraft		
9	Building	Super high efficiency air-conditioner	With COP>7	
10		LED lighting		
11		In house renewable energy system	Solar PV/Wind/Solar hot water and space heating	
12		Heat pumps		Mature
13		High isolation building		Mature
14		High efficiency electric appliance		Mature before 2030
15	Power generation	IGCC/Poly-Generation	With efficiency above 55%	
16		IGCC/Fuel cell	With efficiency above 60%	
17		On shore Wind		Mature
18		Off shore wind		Mature before 2020
19		Solar PV		
20		Solar Thermal		
21		4 <sup>th</sup> Generation Nuclear		
22		Advanced NGCC	With efficiency above 65%	
23		Biomass IGCC		
24		CCS in power generation		
25	Alternative fuels	Second generation bio-ethanol		
26		Bio-diesel	Vehicles, ships, vessels	
27	Grid	Smart grid		
28	Circulating technologies	Recycle, reuse, reducing material use		

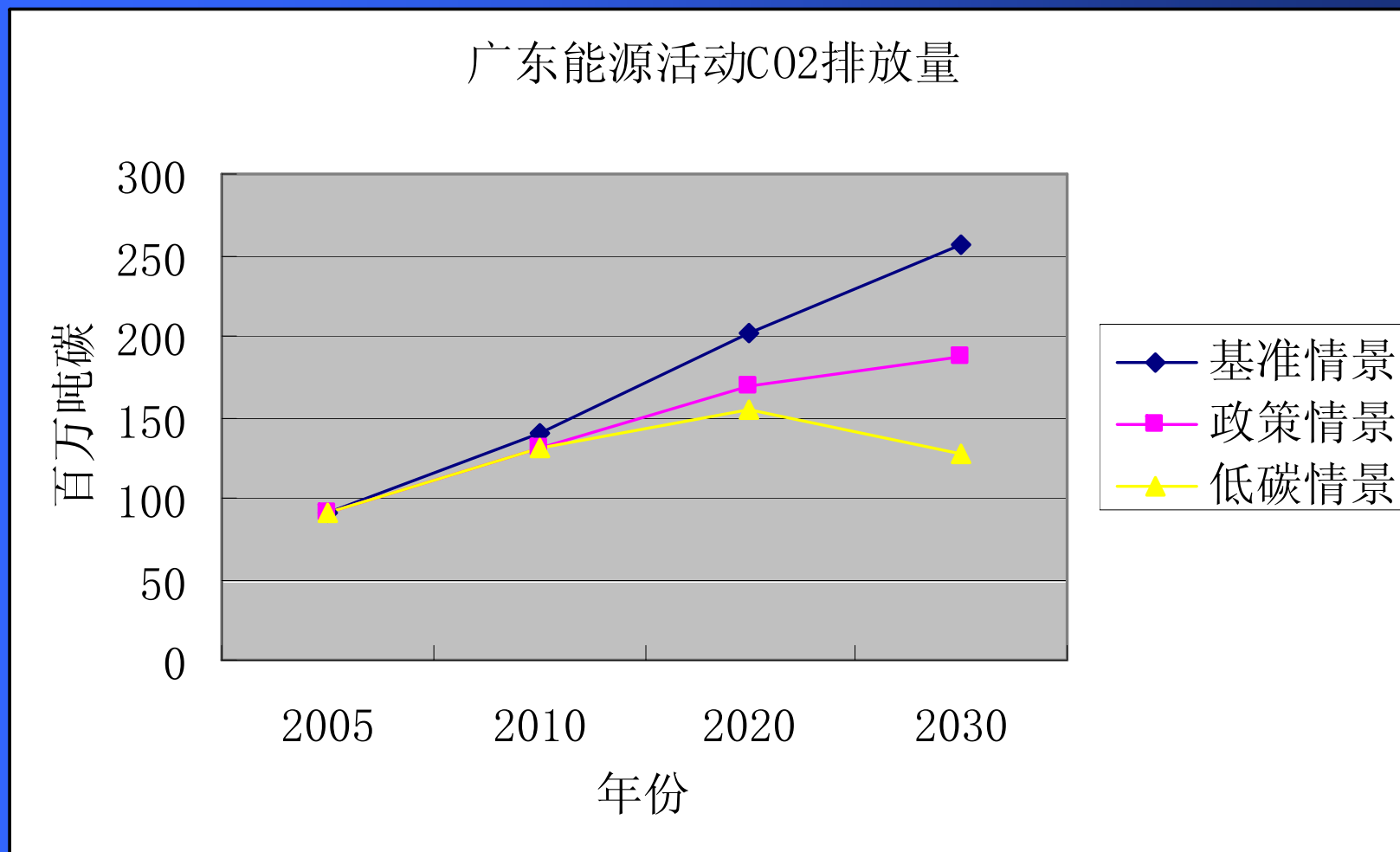
# Technology Roadmap



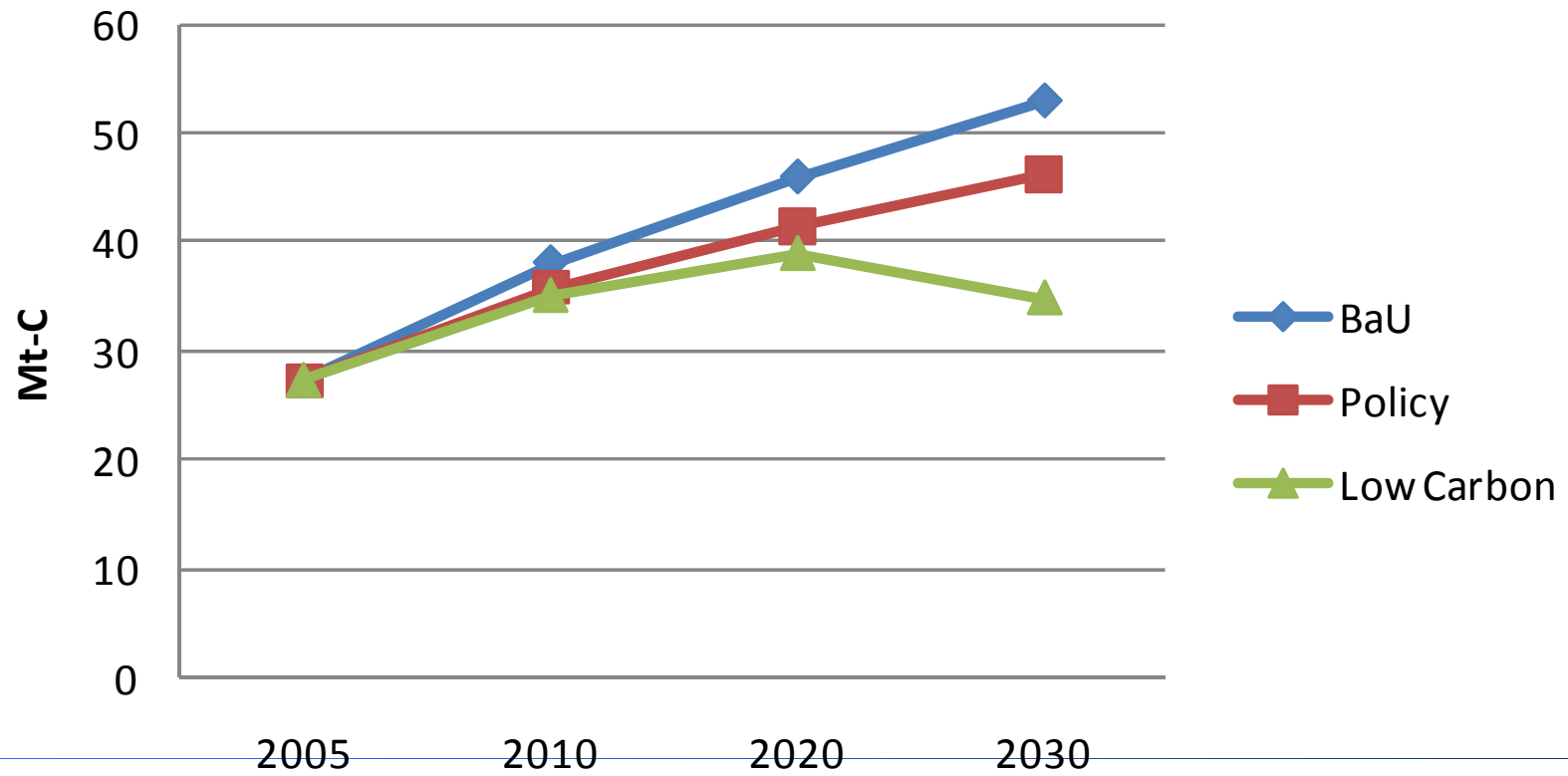
CO2 emission per capita, t-CO2



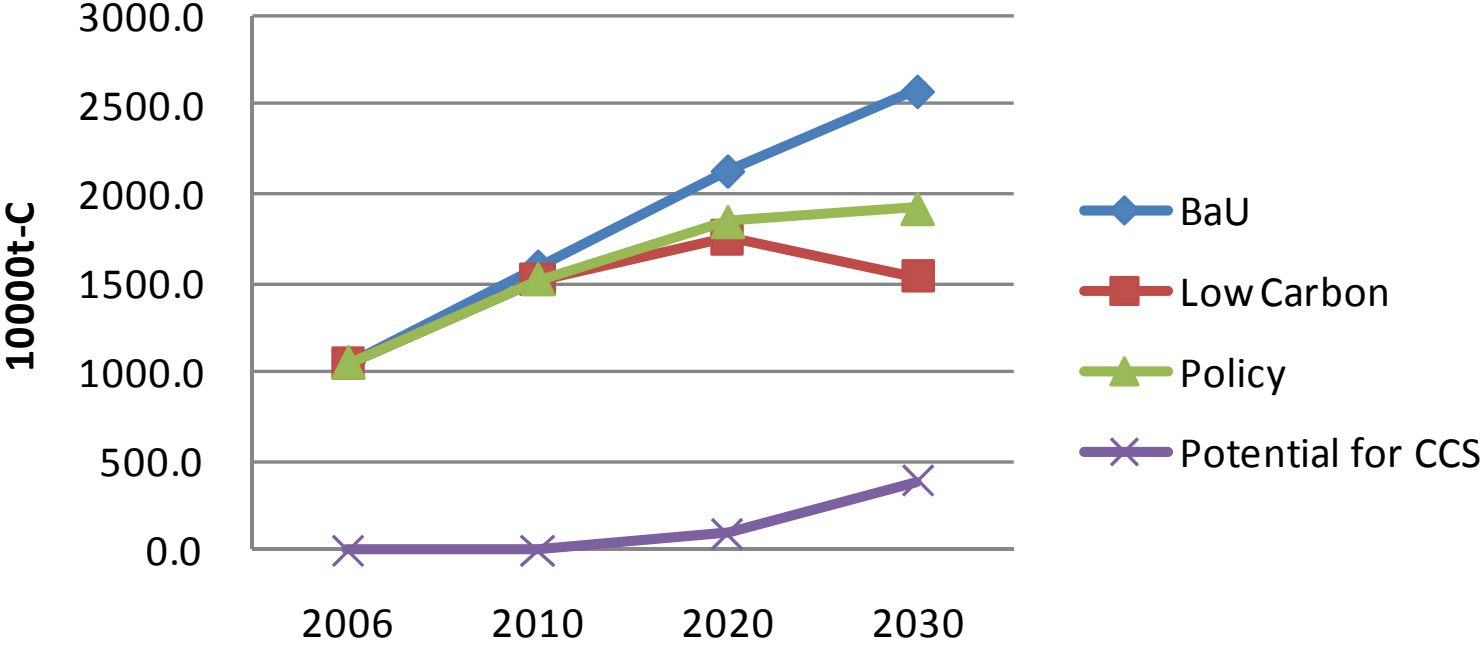
## CO2 emission from energy activities in Guang Dong, mt-C



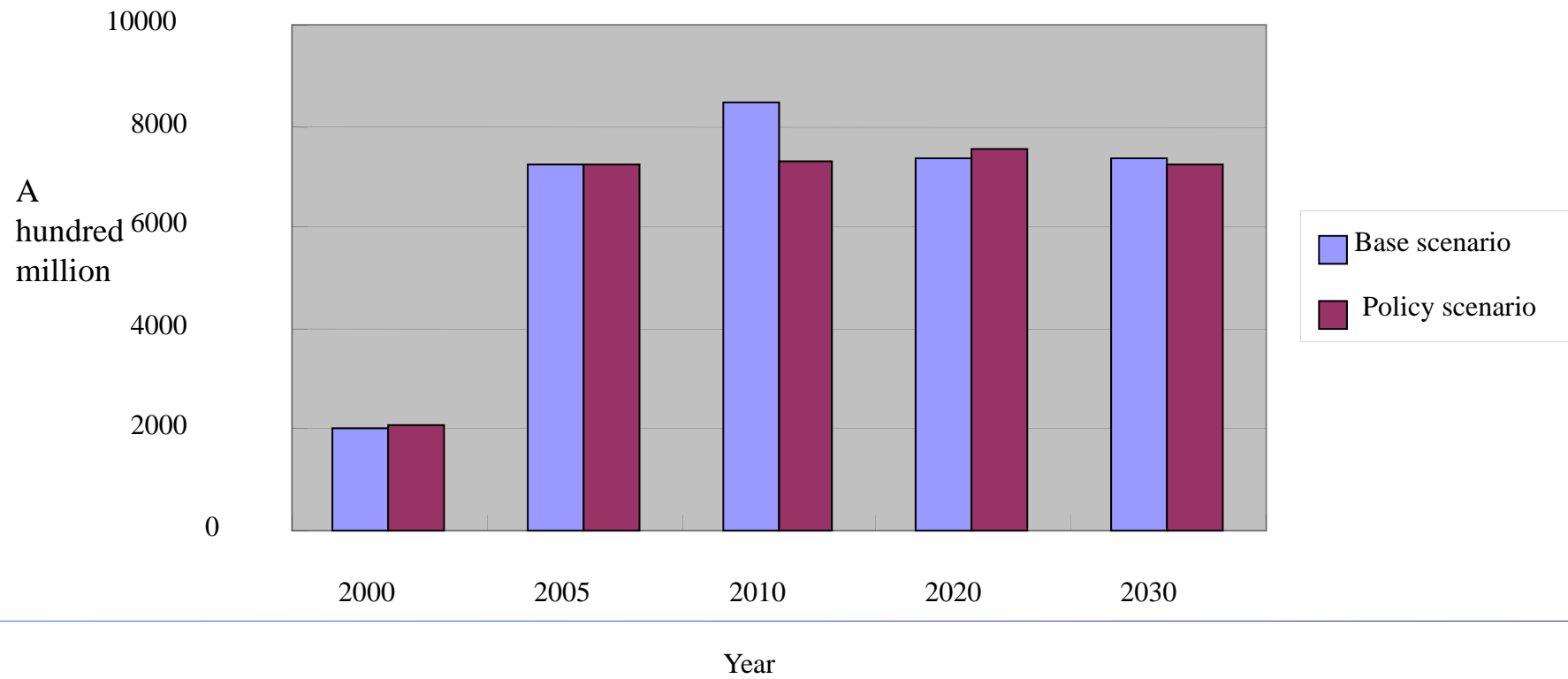
# CO2 Emission in Beijing



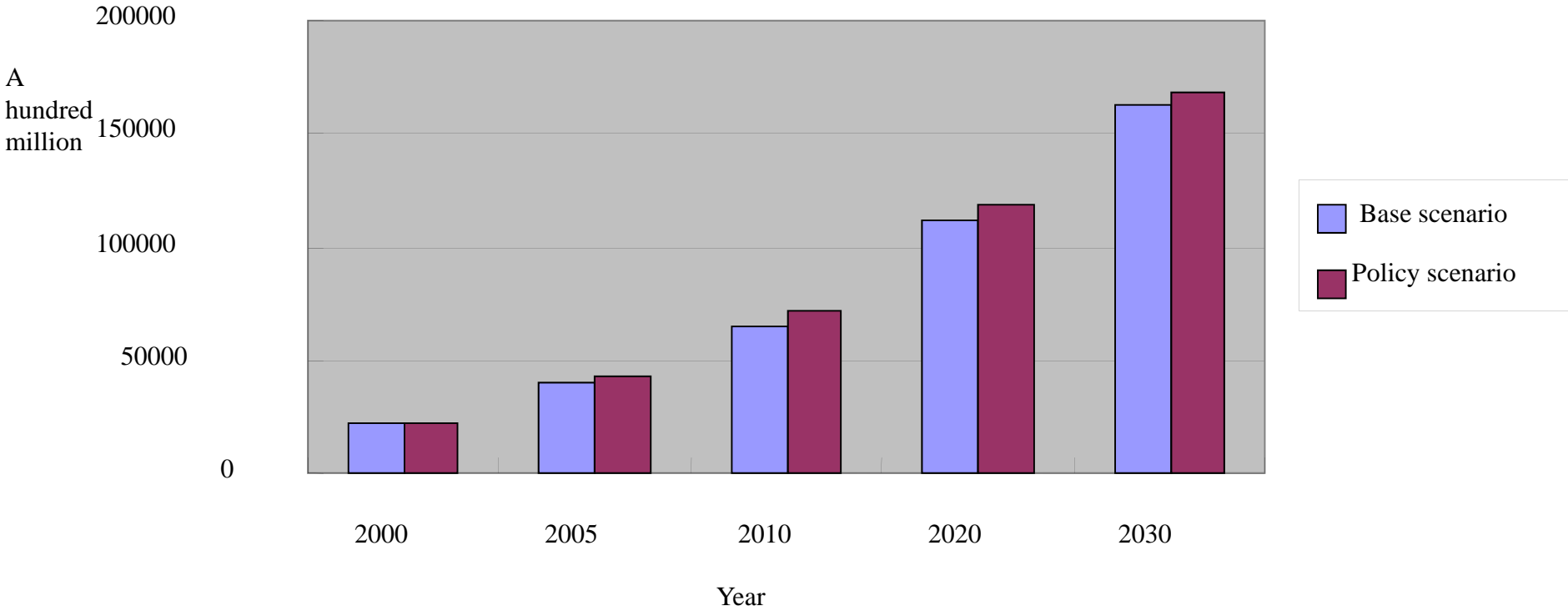
# CO2 Emission from energy use: Jilin City



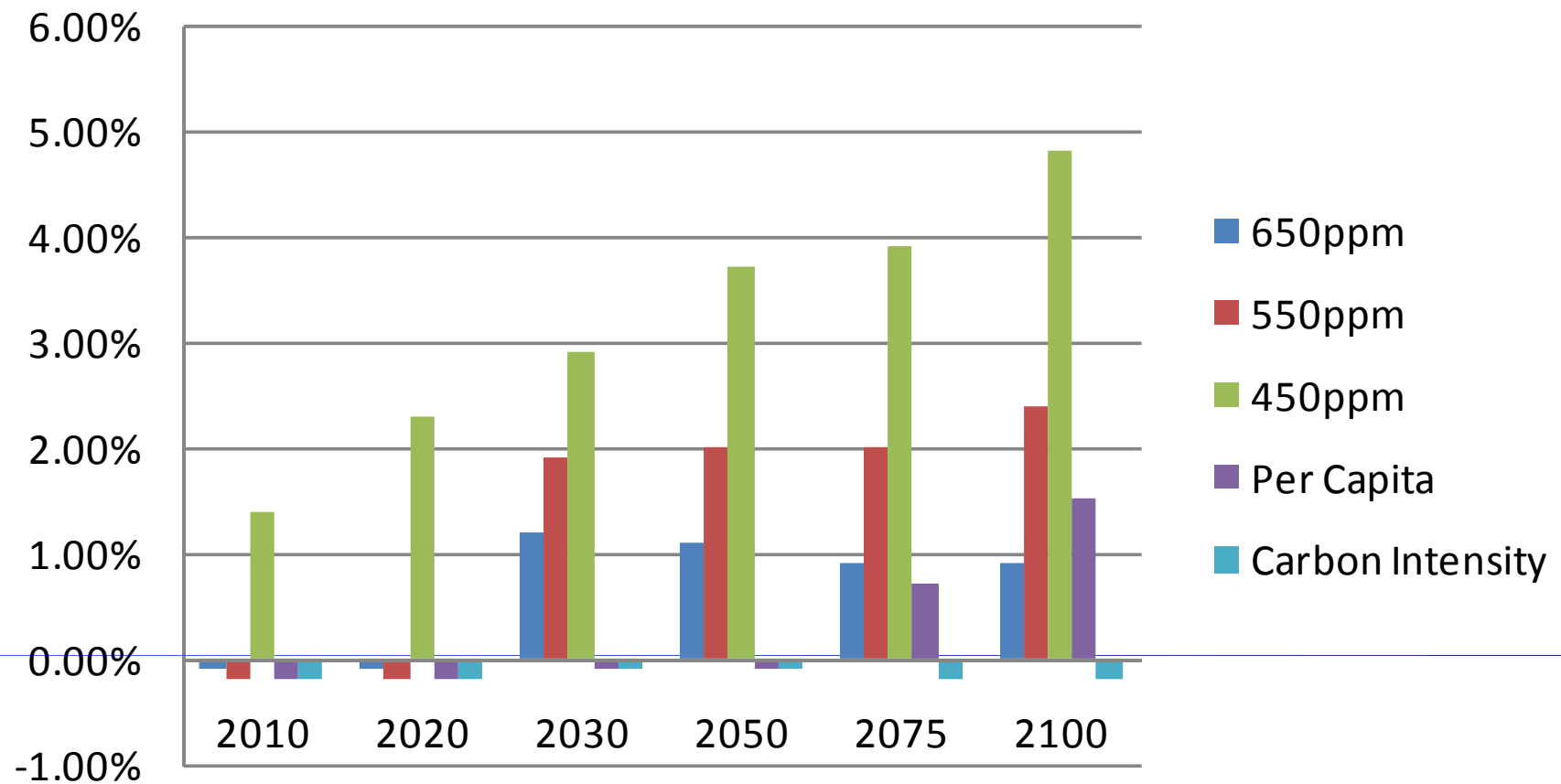
## Investment Demand of Energy Industry



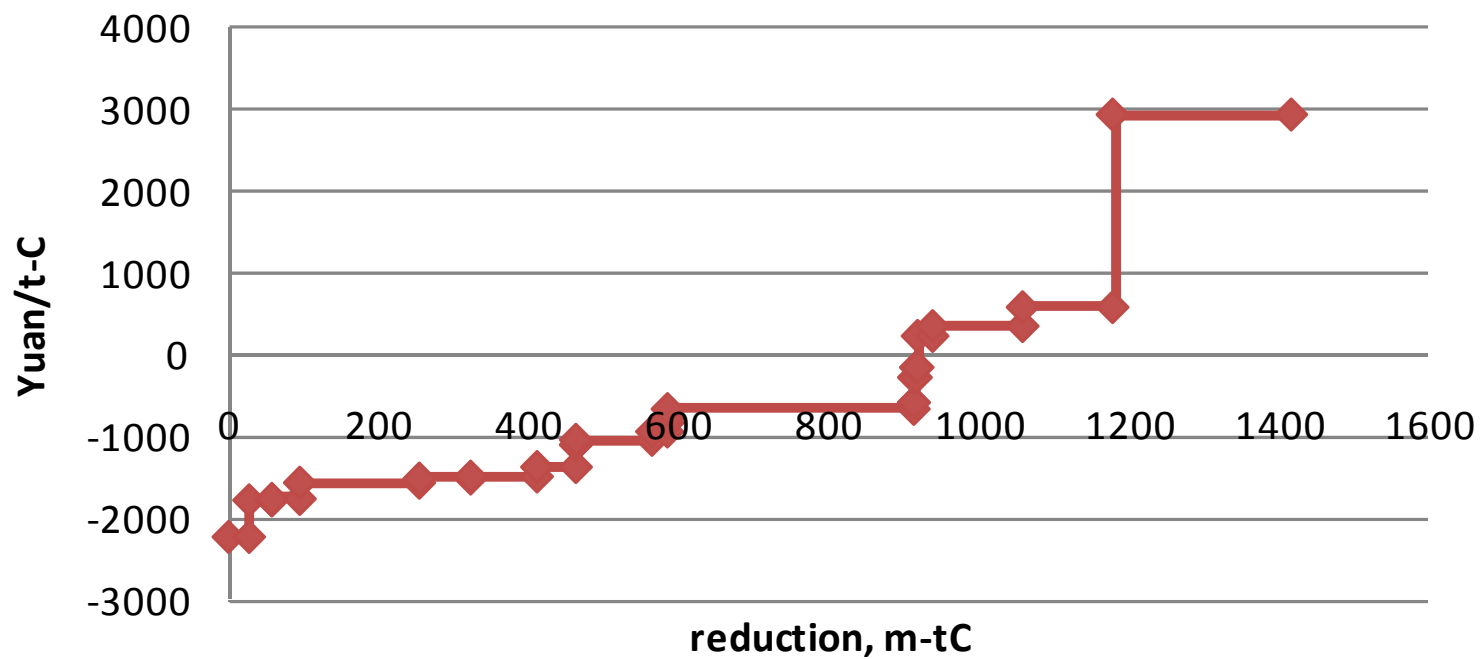
# National Energy Expenses



# GDP Loss, %



## Cost curve in power generation in China, 2050





## Fixed Unit Investment

