

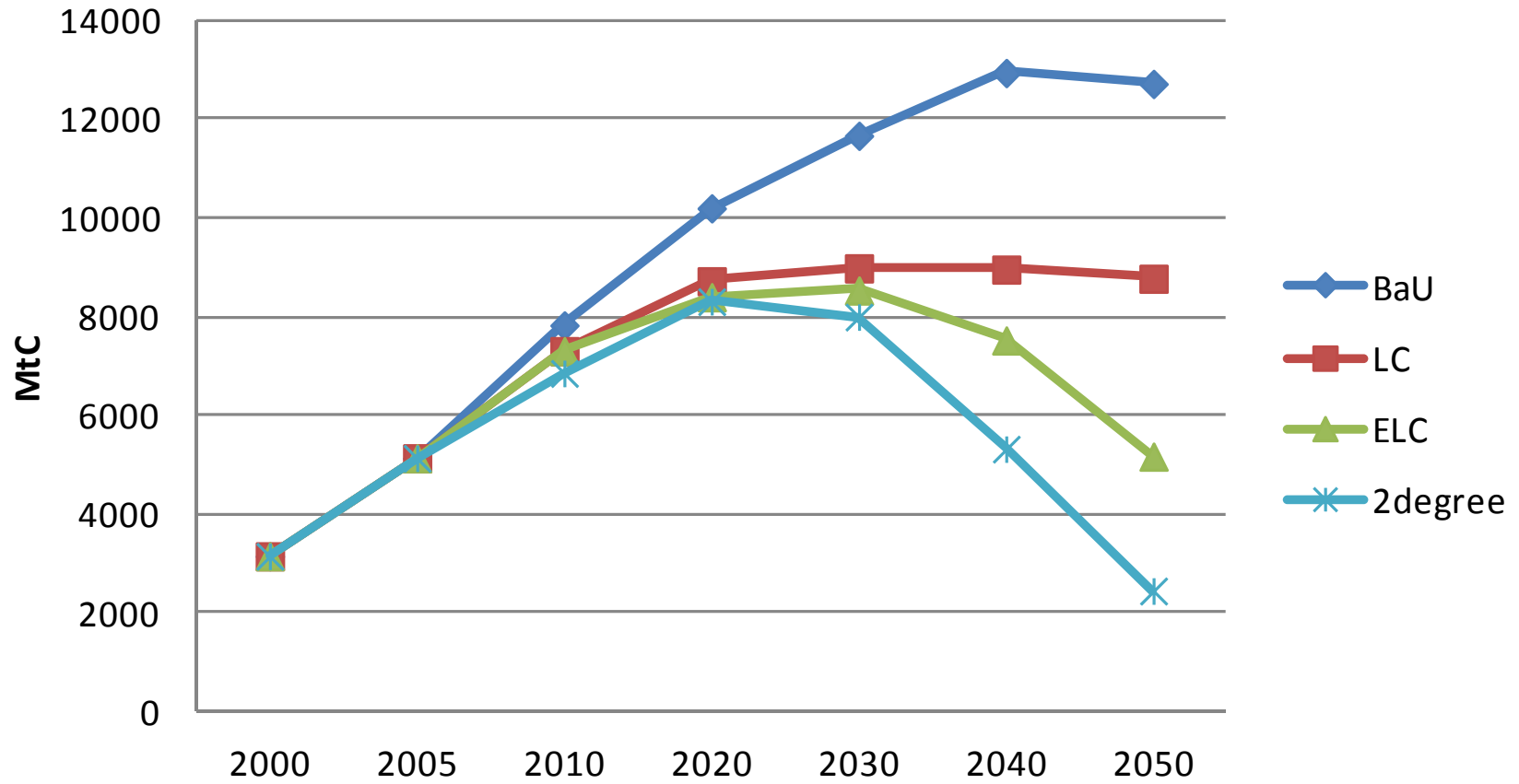
# Natural Gas in China's Low Carbon Scenario

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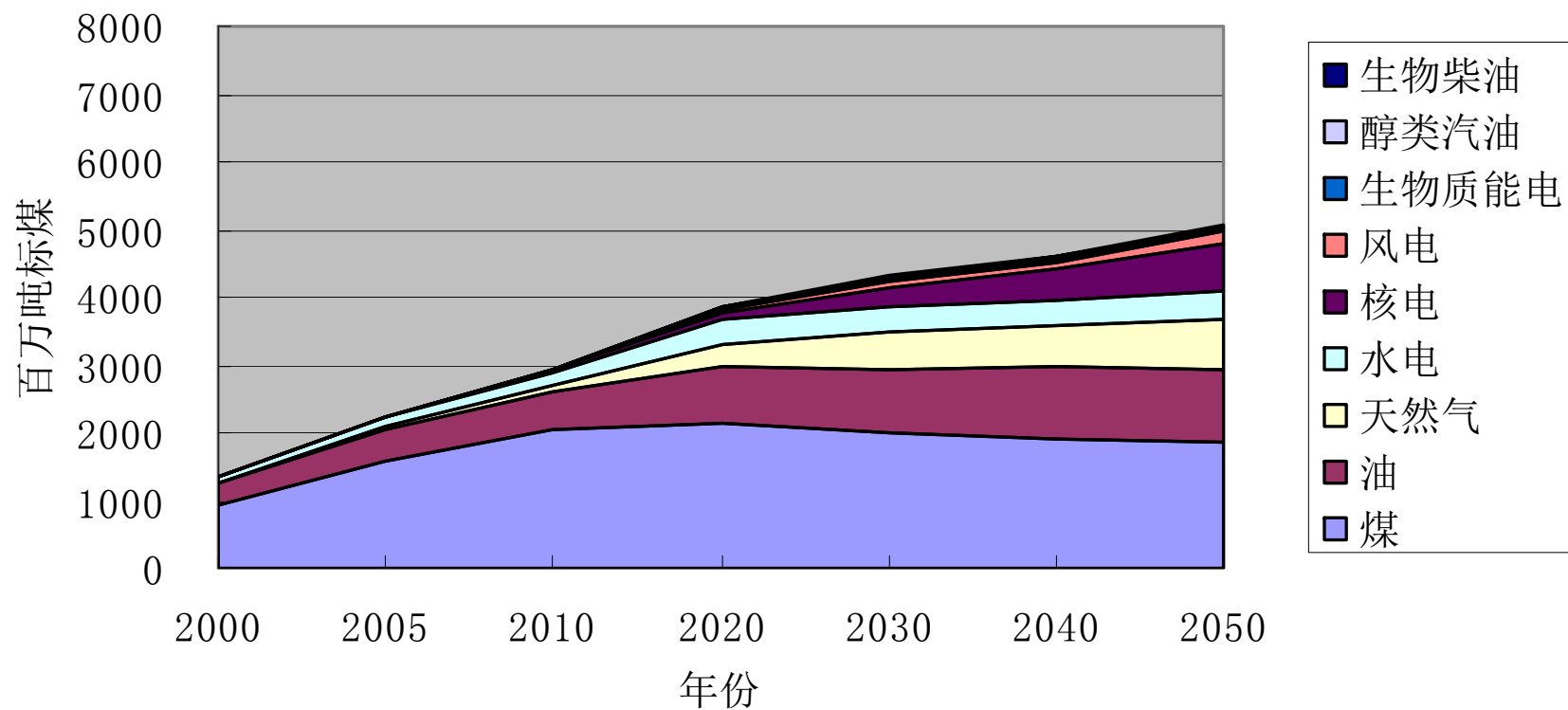
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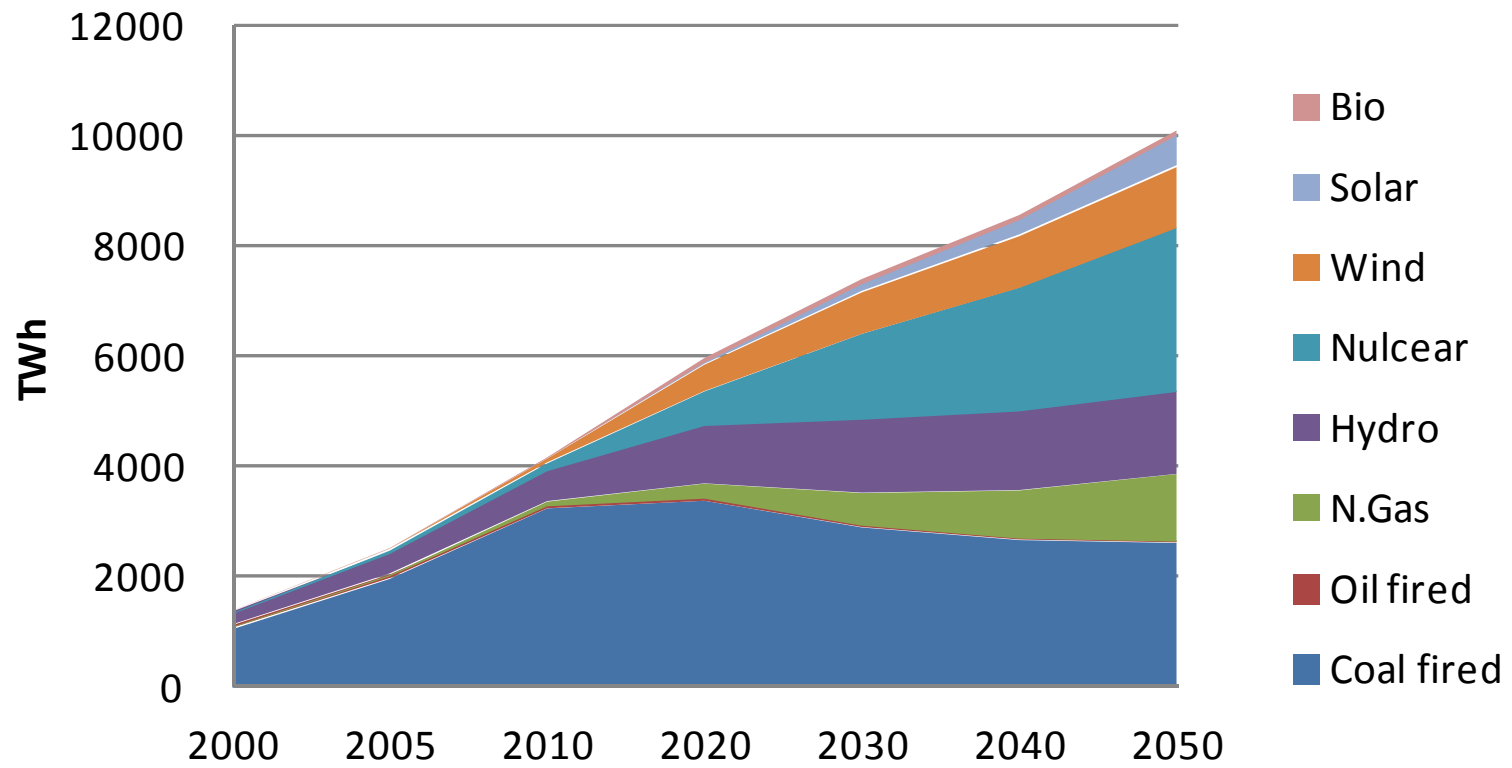
# CO2 Emission



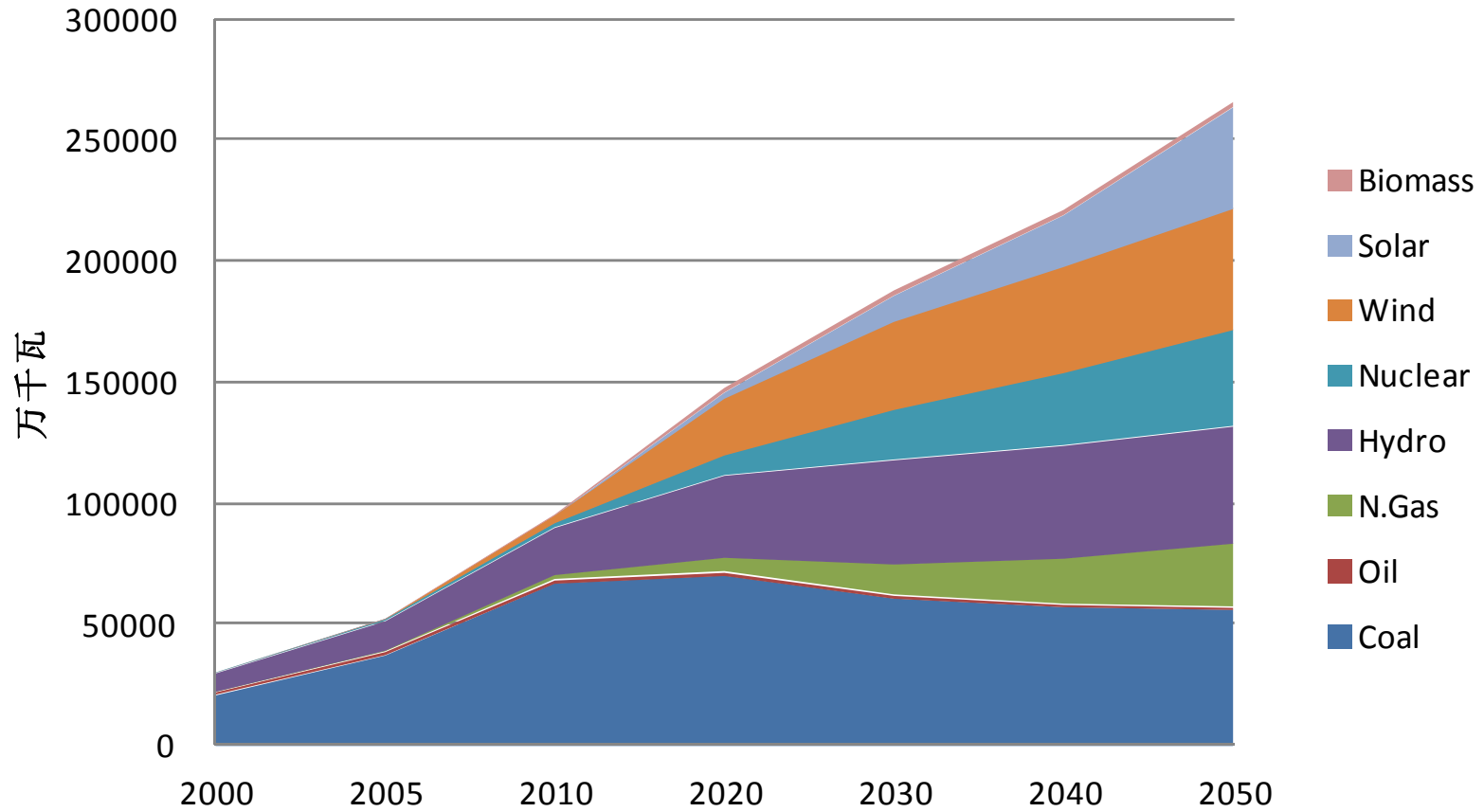
一次能源需求量，低碳情景



# Power Generation



# Power Generation Capacity



## Natural Gas Scenarios

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- In 2010, Natural Gas use 107.2BCM, while 12.2BCM imported.
- In our low carbon scenario: by 2030, 370BCM
- NEA's planning: 260BCM by 2015

## Key technologies for Natural Gas use in China

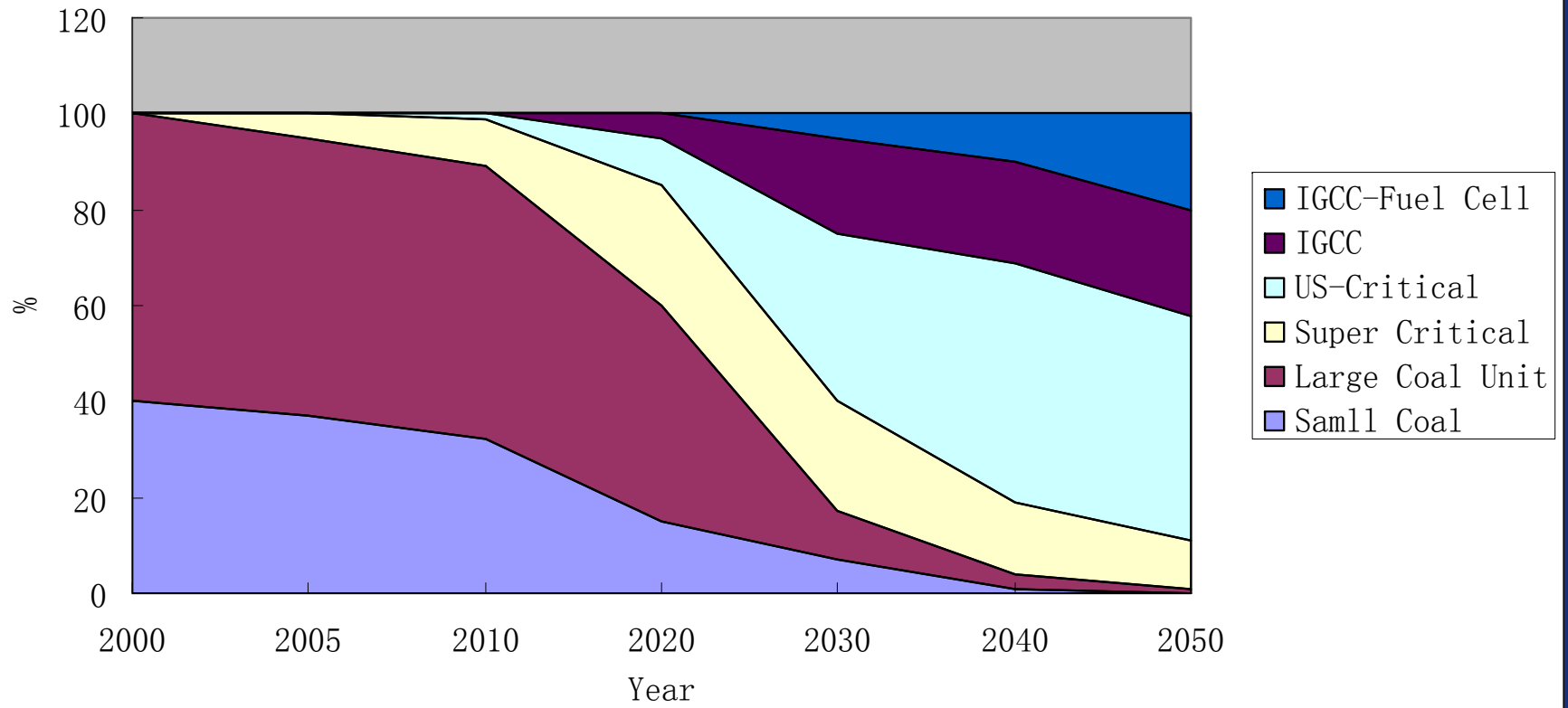
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- NGCC, +CCS, for power generation and CHP
- Gas Boiler for space heating
- Tri-Generation for power, heat, and cooling
- Chemical industry

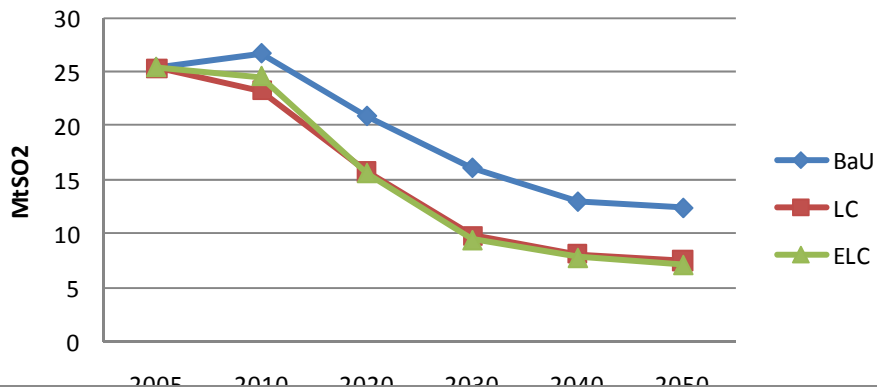
## Advanced NGCC by today

Turbine	Unit	GE-MS7001H	Westinghouse 501-ATS
Preliminary temp.	°C	1,430	1,510
Pressure ratio	/	23	28
Single cycle capacity	MW	/	290
Single Cycle Efficiency	%	/	41
Combine Cycle Capacity	MW	400	426
Combine Cycle Efficiency	%	60	61
NOX Emission	PPm	9	≈5

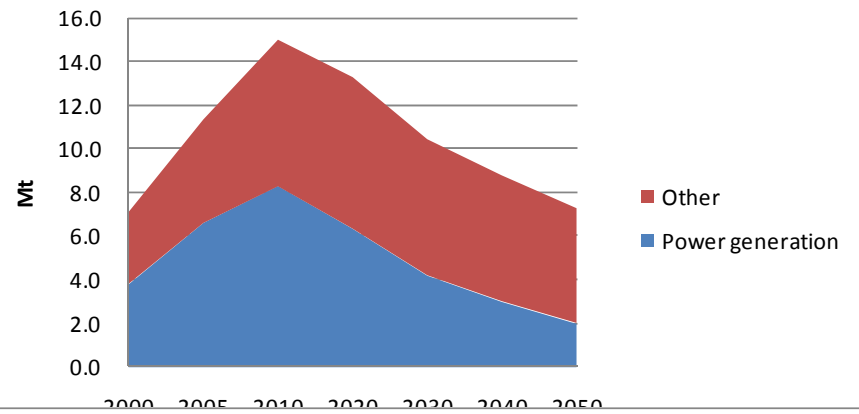
CCS future



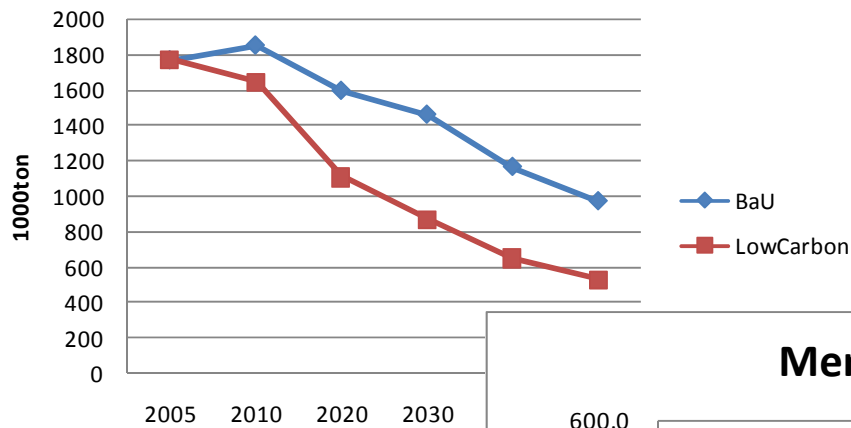
### SO2 Emission



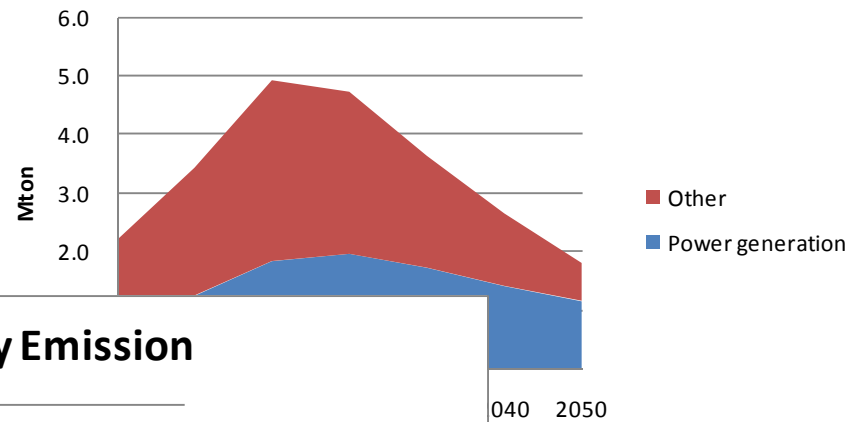
### NOx Emission in China, ELC scenario



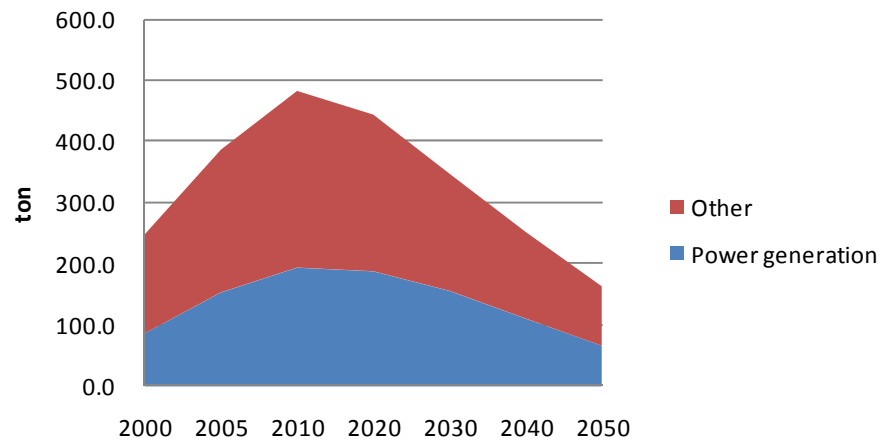
### Black Carbon Emission in China



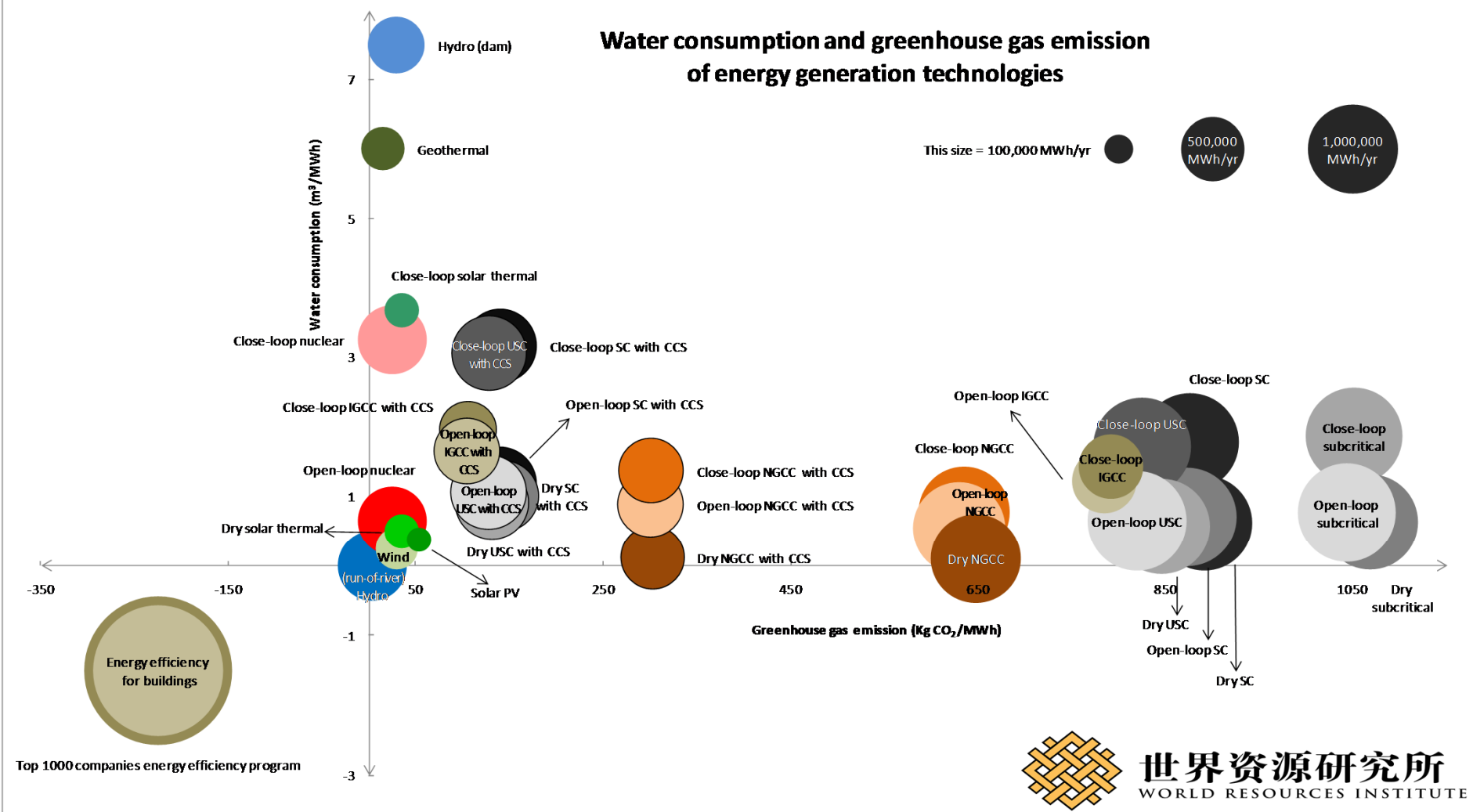
### PM2.5 Emission



### Mercury Emission



## Water consumption and greenhouse gas emission of energy generation technologies



## 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		