

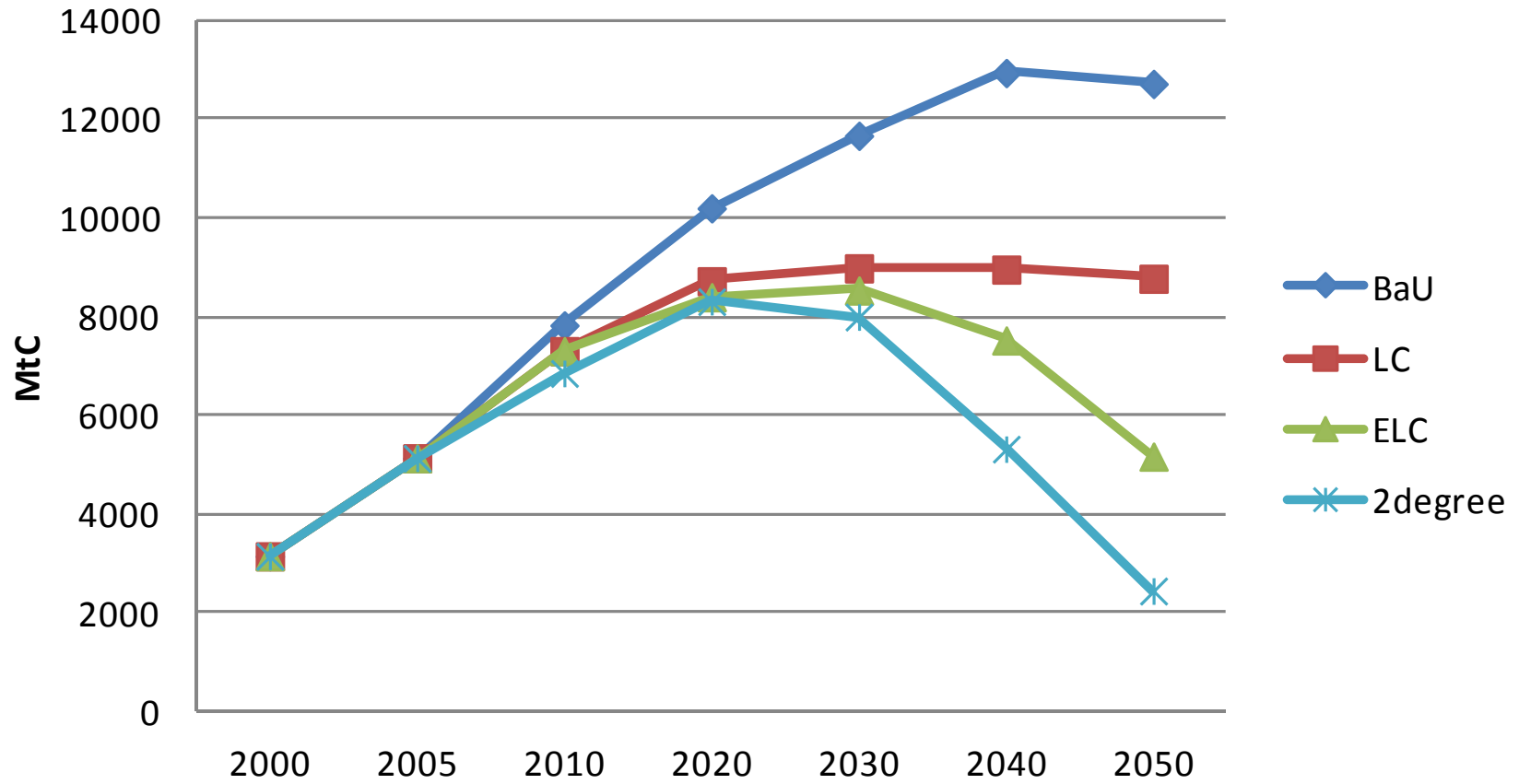
Natural Gas in China's Low Carbon Scenario

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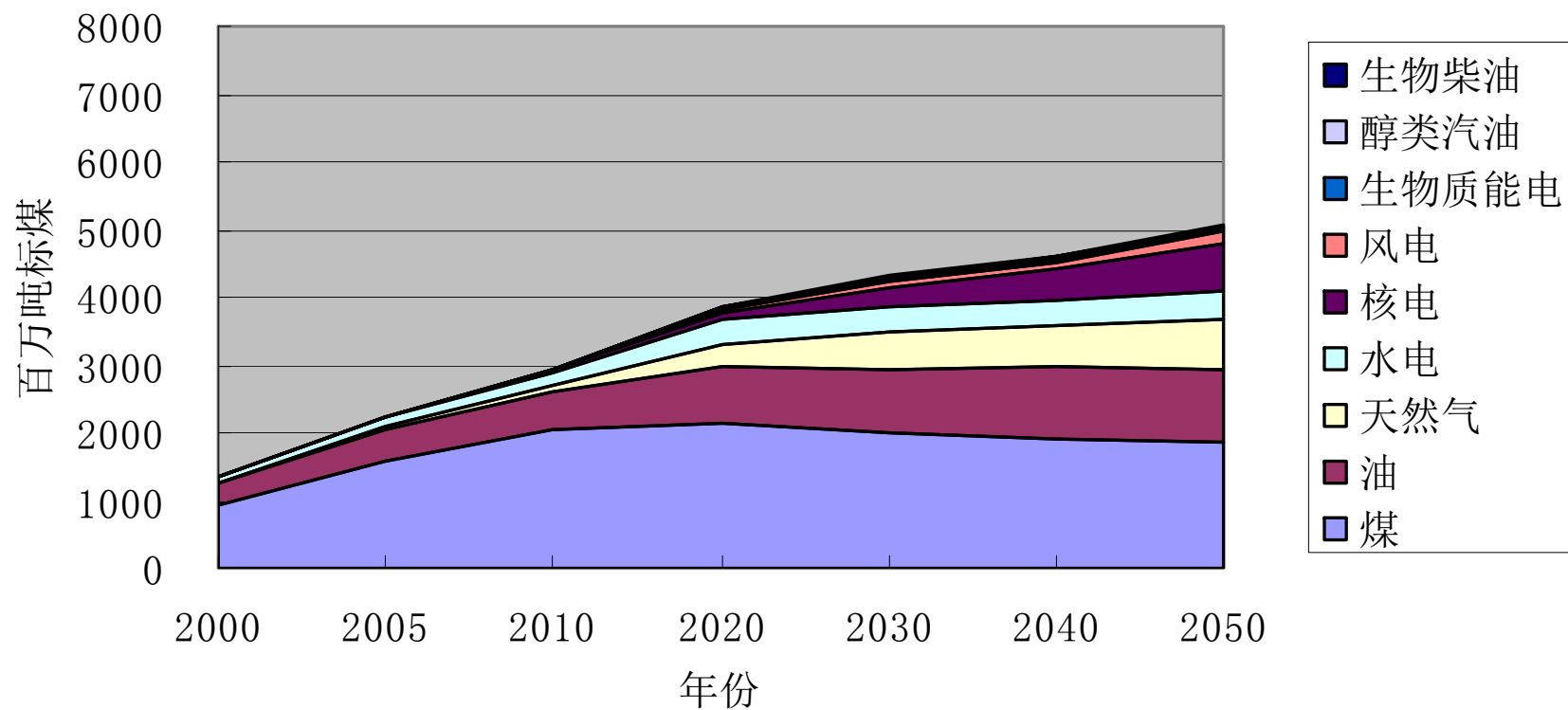
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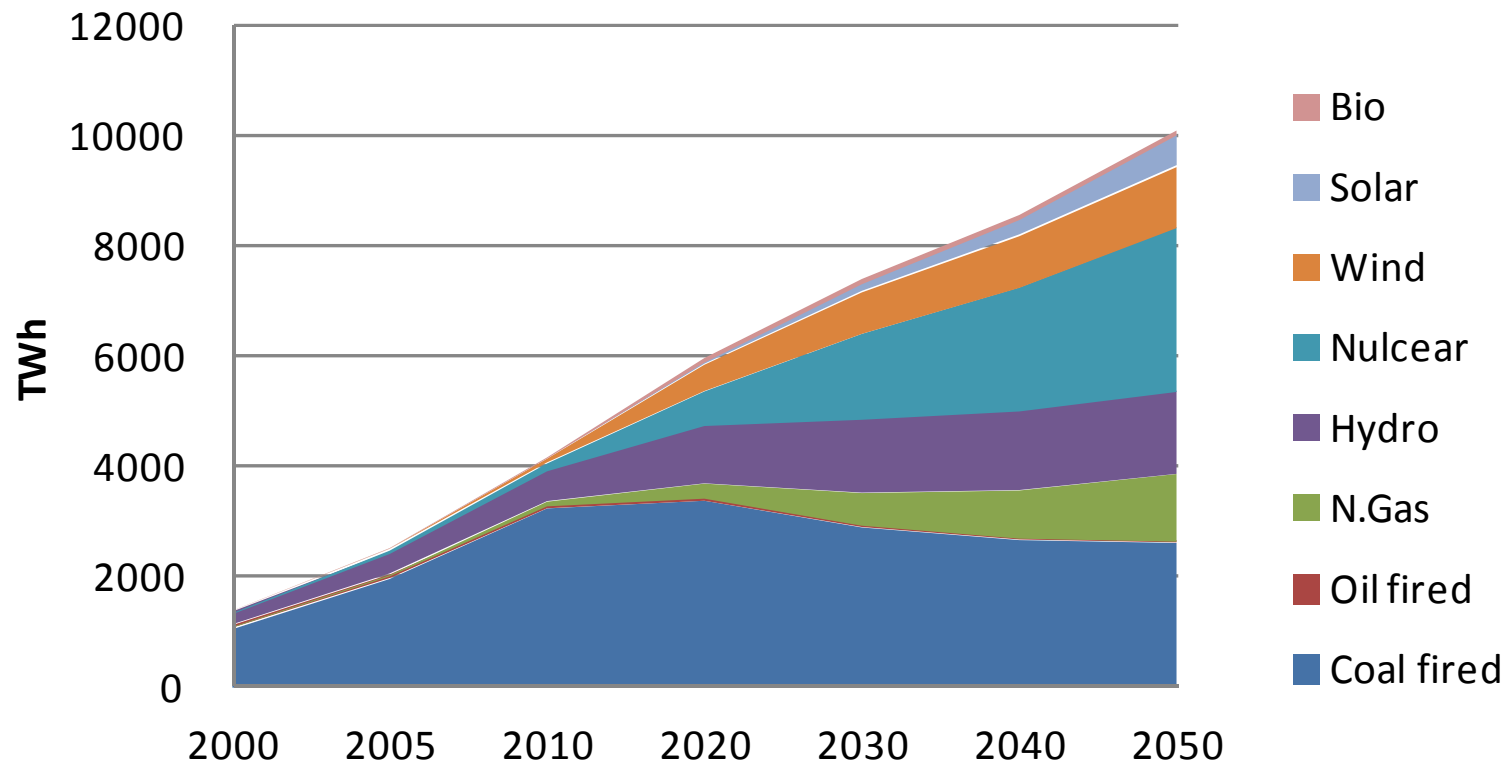
CO2 Emission



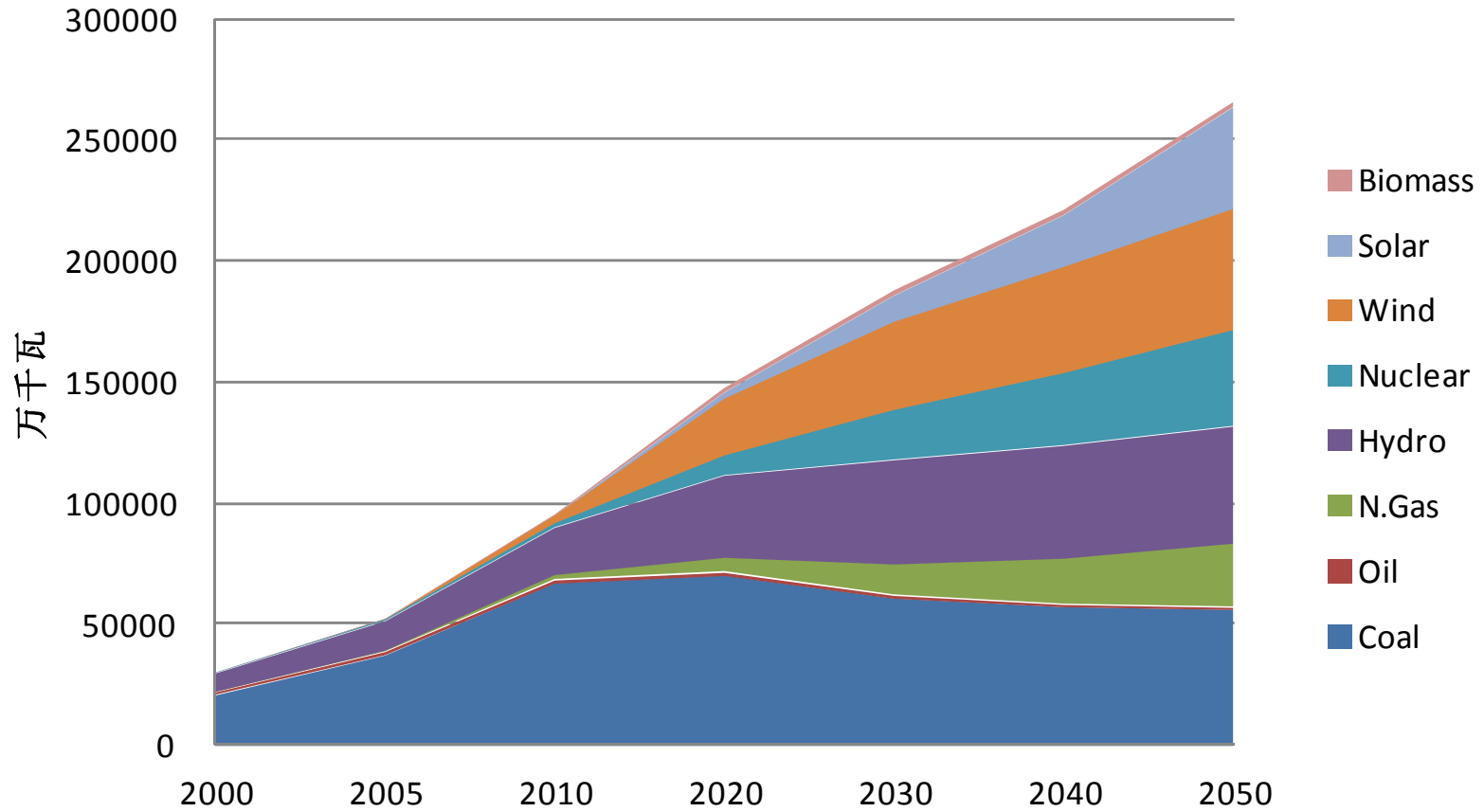
一次能源需求量，低碳情景



Power Generation



Power Generation Capacity



Natural Gas Scenarios

- 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

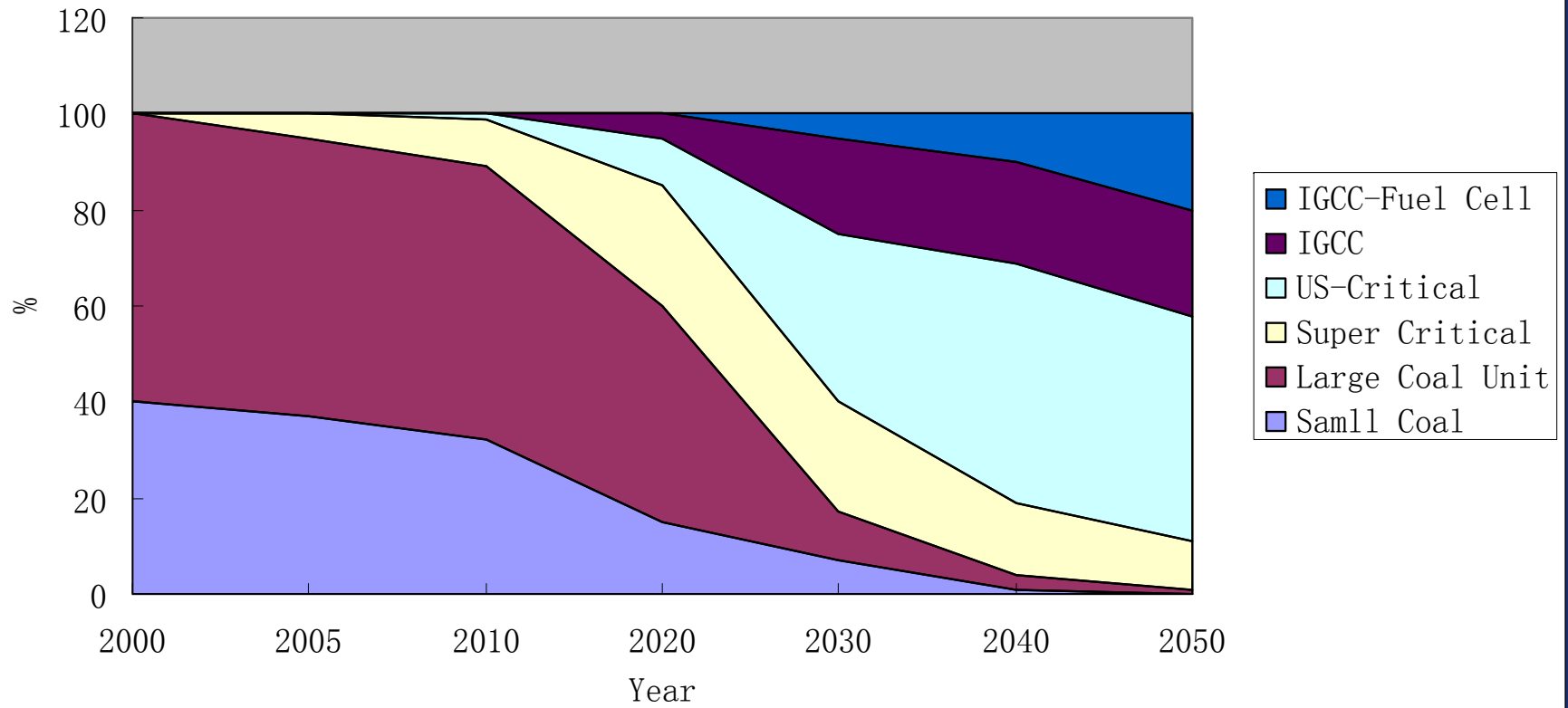
Key technologies for Natural Gas use in China

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

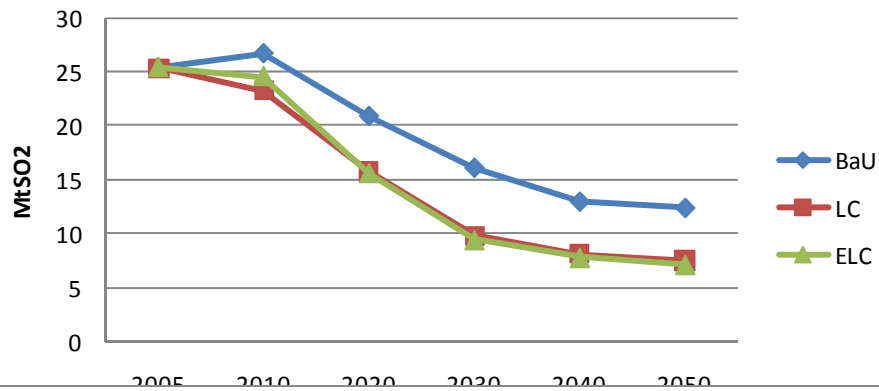
Advanced NGCC by today

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

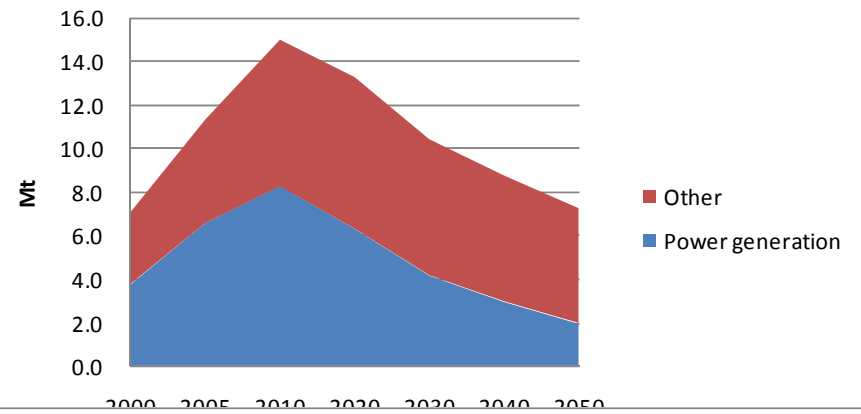
CCS future



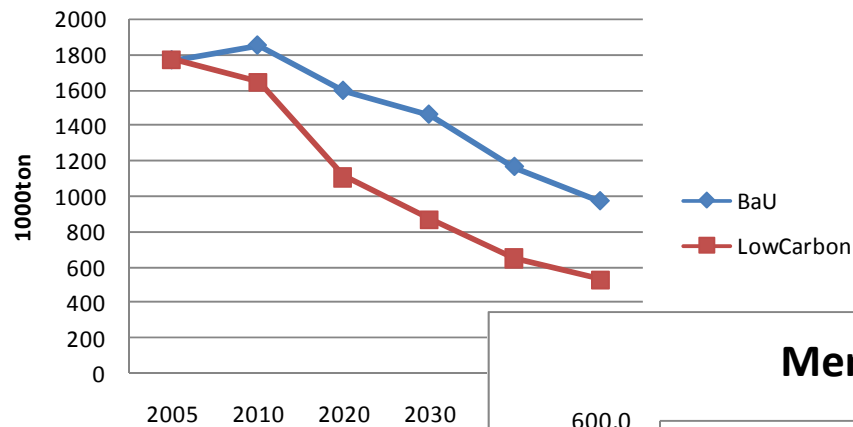
SO2 Emission



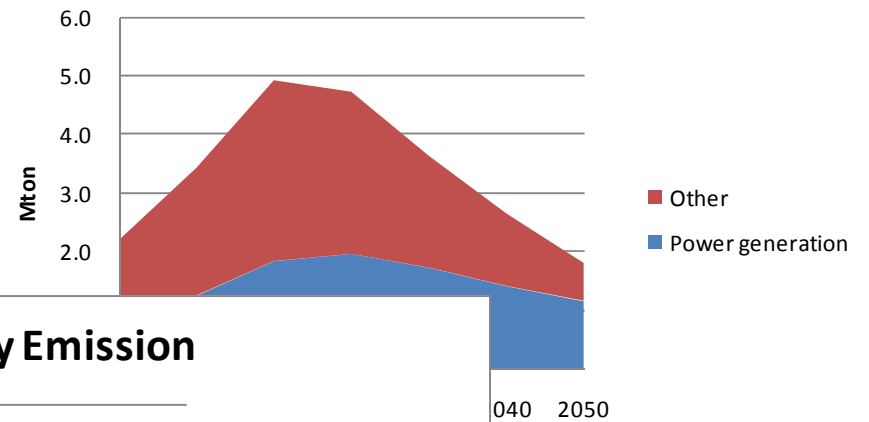
NOx Emission in China, ELC scenario



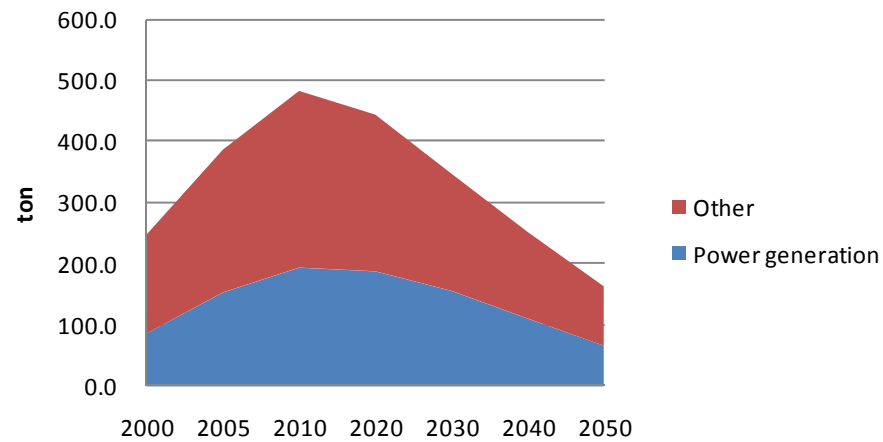
Black Carbon Emission in China



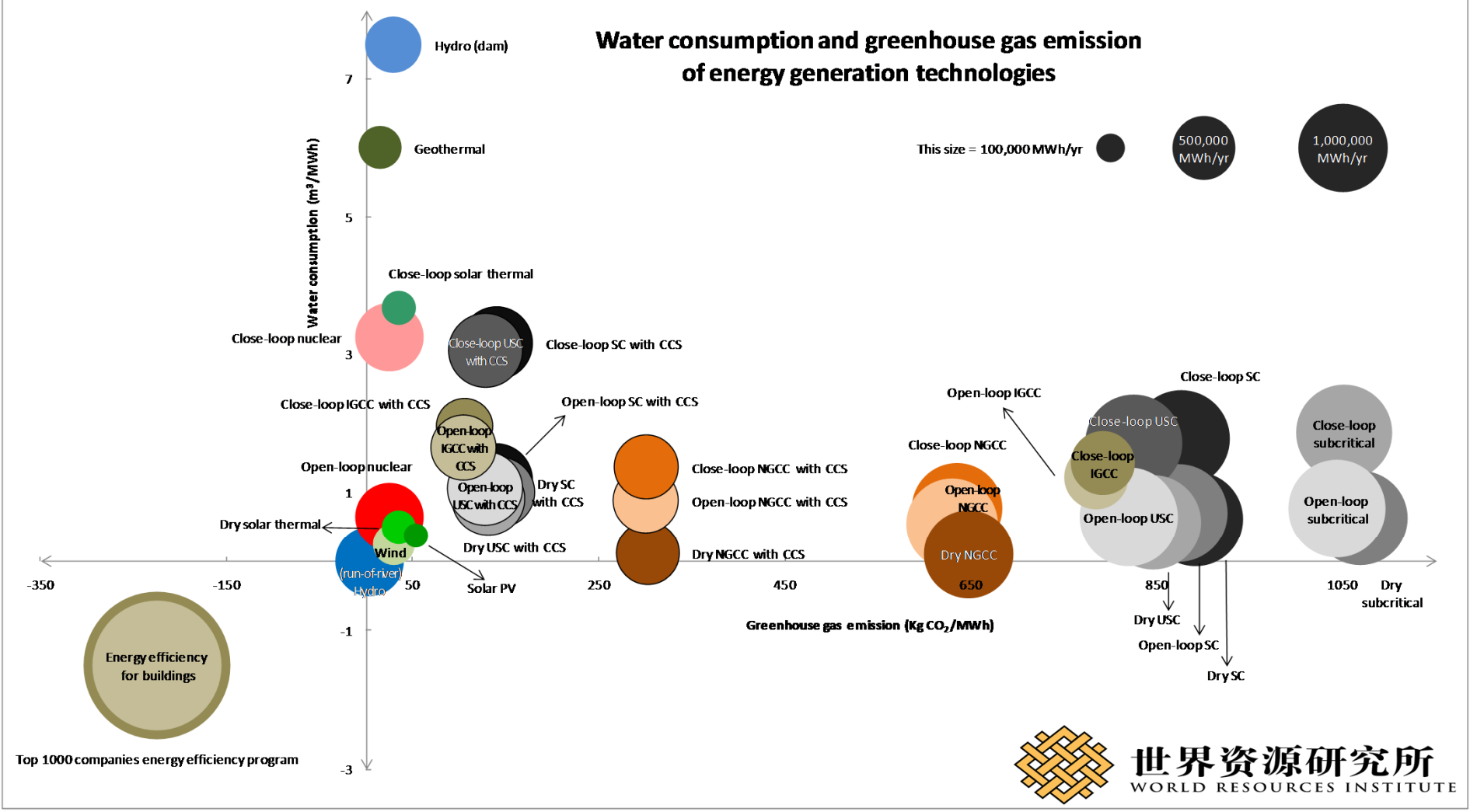
PM2.5 Emission



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 th 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		