

China's CO2 Emission Scenario Toward 2 degree global target

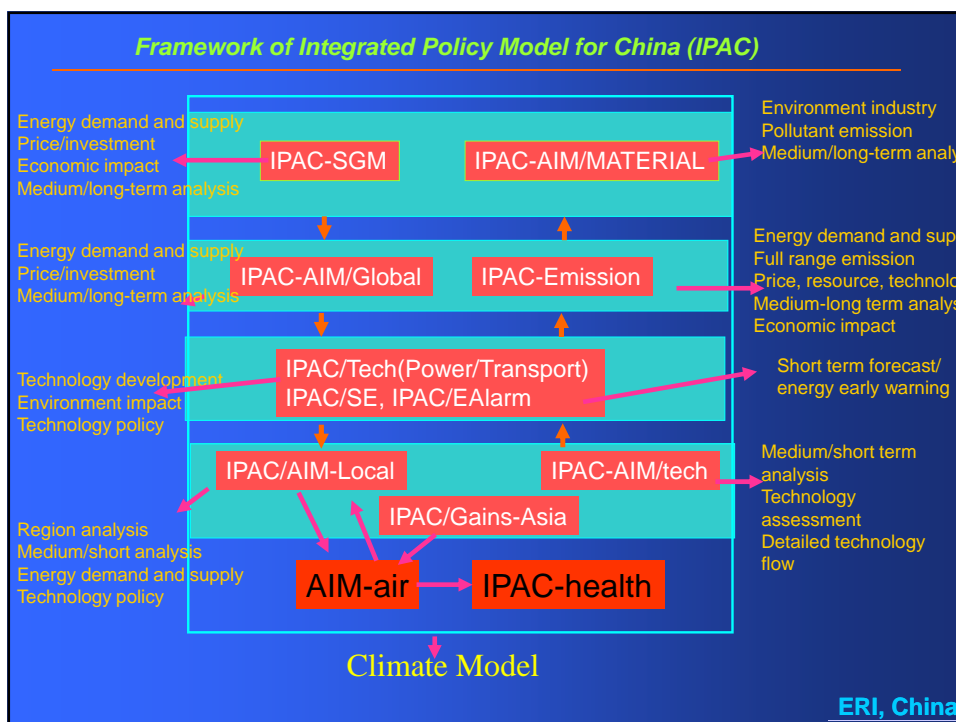
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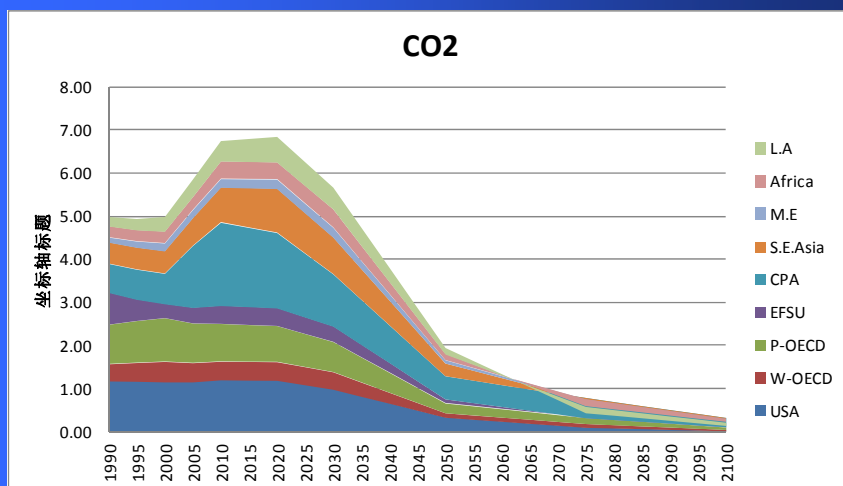
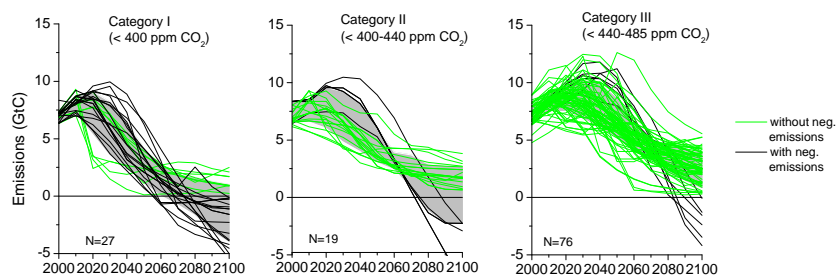
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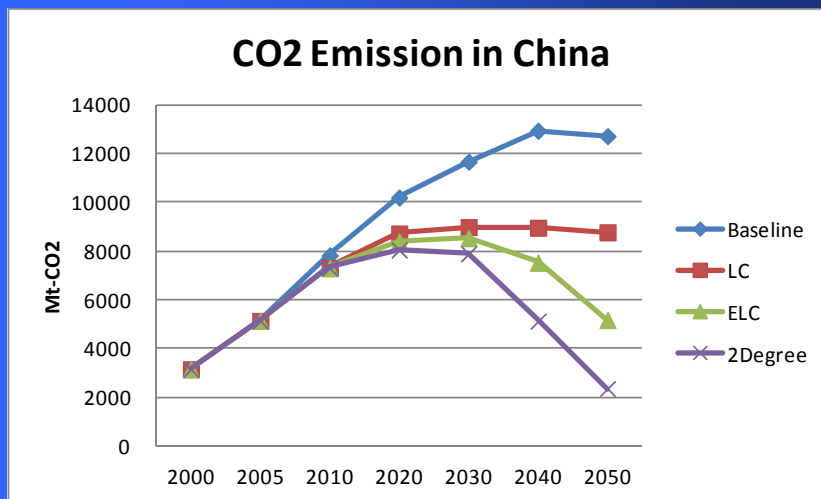
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Keyword: Transition – mitigation to reach some climate change targets

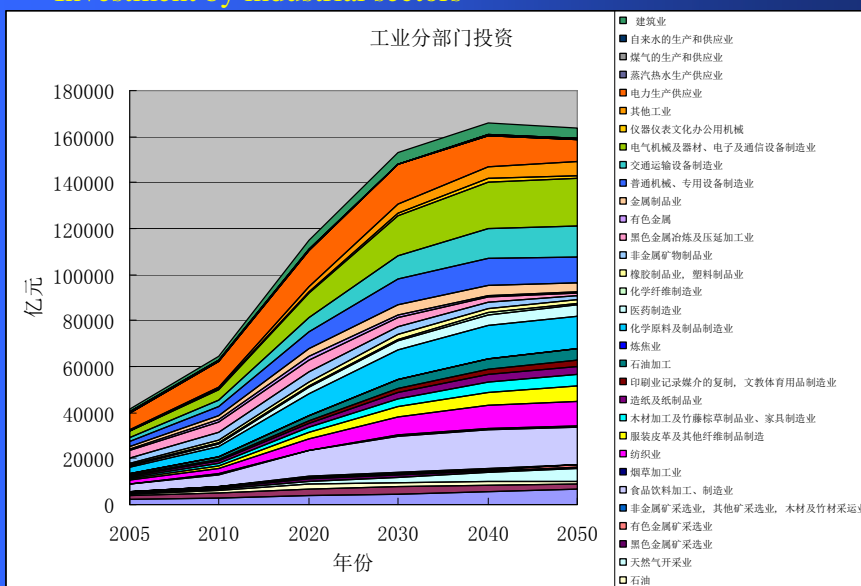


Transformation: CO2 emission, a rapid change



Transformation: Economy system

Investment by industrial sectors

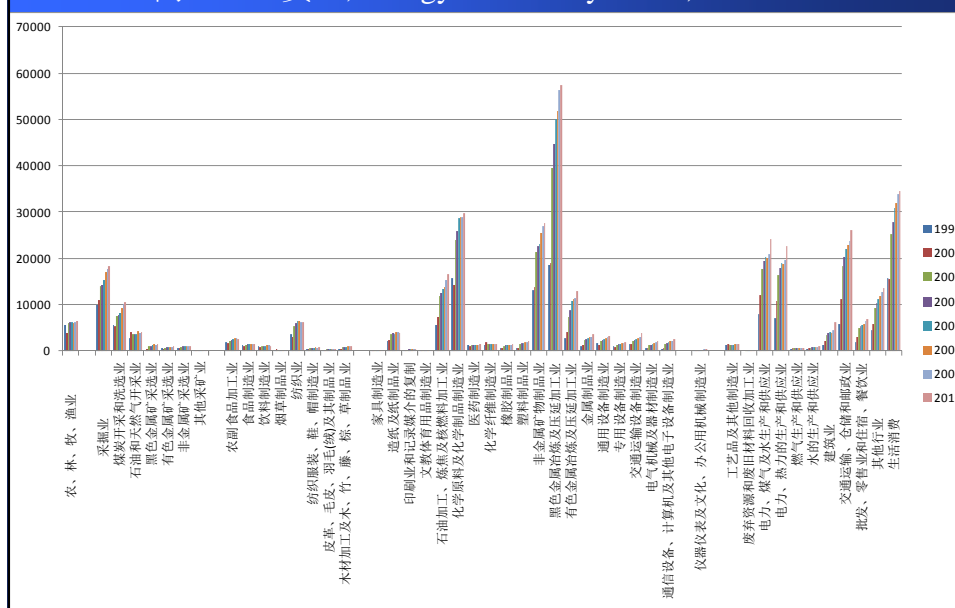


Products output in major sectors, Low Carbon and ELC

	Unit	2005	2020	2030	2040	2050
Steel	Million ton	355	610	570	440	360
Cement	Million ton	1060	1600	1600	1200	900
Glass	Million cases	399	650	690	670	580
Copper	Million ton	2.6	7	7	6.5	4.6
Ammonia	Million ton	8.51	16	16	15	12
Ethylene	Million ton	5.1	7.2	7	6.5	5.5
Soda Ash	Million ton	14.67	23	24.5	23.5	22
Casutic	Million ton	12.64	24	25	25	24
Paper	Million ton	62.05	110	115	120	120
Fertilize	Million ton	52.2	61	61	61	61
Aluminum	Million ton	7.56	34	36	36	33
Paper	Million ton	46.3	50	50	50	45
Calcium c	Million ton	8.5	10	8	7	4

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分部门能源消费量, Energy demand by sector, 1995-2010



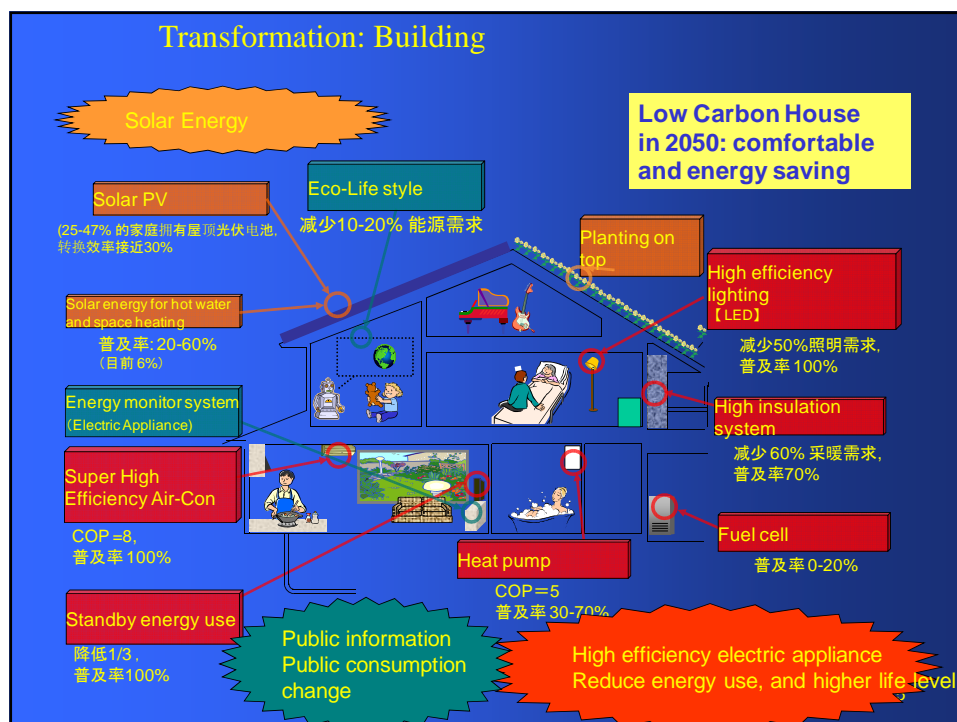
Transformation: Energy efficiency

Unit energy use for key products, LCS Scenario

	Unit	2005	2020	2030	2040	2050
Steel	Kgce/t	760	650	564	554	545
Cement	Kgce/t	132	101	86	81	77
Glass	Kgce/Weight Cases	24	18	14.5	13.8	13.1
Brick	Kgce/万块	685	466	433	421	408
Ammonia	Kgce/t	1645	1328	1189	1141	1096
Ethylene	Kgce/t	1092	796	713	693	672
Soda Ash	Kgce/t	340	310	290	284	279
Casutic	Kgce/t	1410	990	890	868	851
Calcium carbide	Kgce/t	1482	1304	1215	1201	1193
Copper	Kgce/t	1273	1063	931	877	827
Aluminum	kWh/t	14320	12870	12170	11923	11877
Paper	Kgce/t	1047	840	761	721	686
Electricity fossil fuel	Gce/kWh	350	305	287	274	264

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Transformation: Building





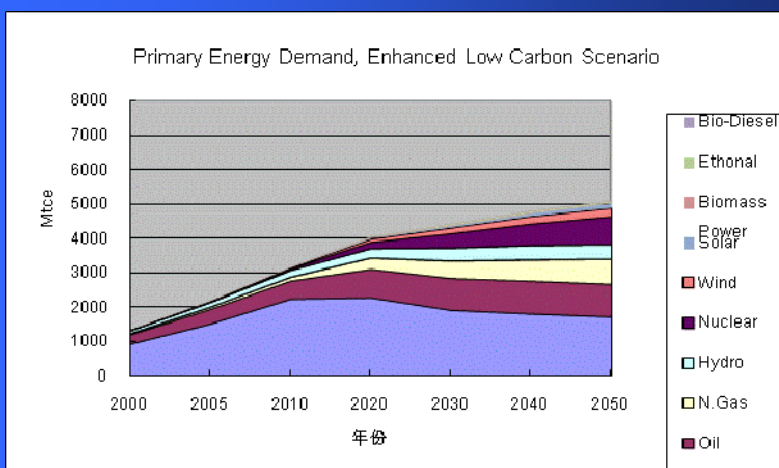
Transformation: Transport

Transport, Low carbon scenario

		2005	2010	2020	2030	2040	2050
Family car ownership, per 100HH	Urban	3.37	14	36	65	77	78
	Rural	0.08	0.2	8	38	70	90
Family car annual travel distance, km		9500	9500	9300	8635	8300	7480
Average engine size of family cars, liter		1.7	1.6	1.6	1.6	1.5	1.4
Fuel efficiency of car, L/100km		9.2	8.9	7.1	5.9	4.8	4.1
Share of MRT in total traffic volume, %		0.011	0.016	0.025	0.046	0.1	0.21
Share of Biofuel, %		1.10%	1.30%	4.1%	7.70%	12%	13%
Share of electric car, %		0%	0.12%	3.2%	6.80%	12.5%	19.8%
Share of fuel cell car, %		0%	0%	0.80%	1.60%	4.70%	7.90%

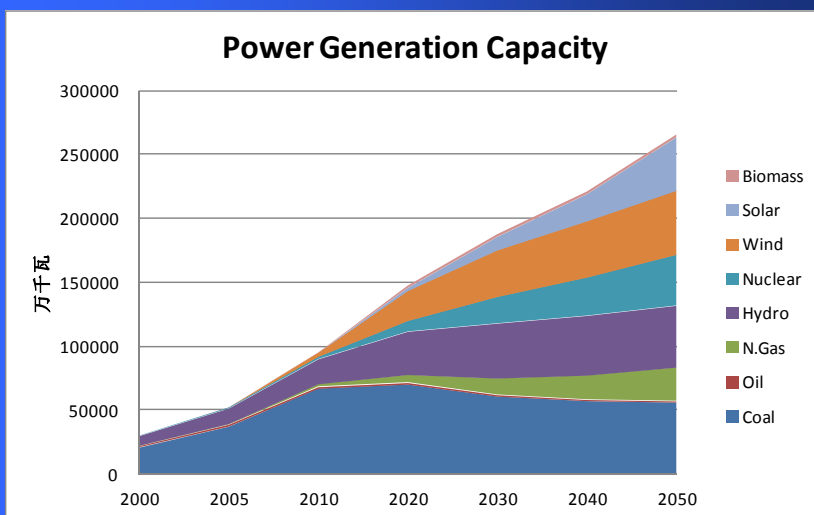
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Transformation: Energy System

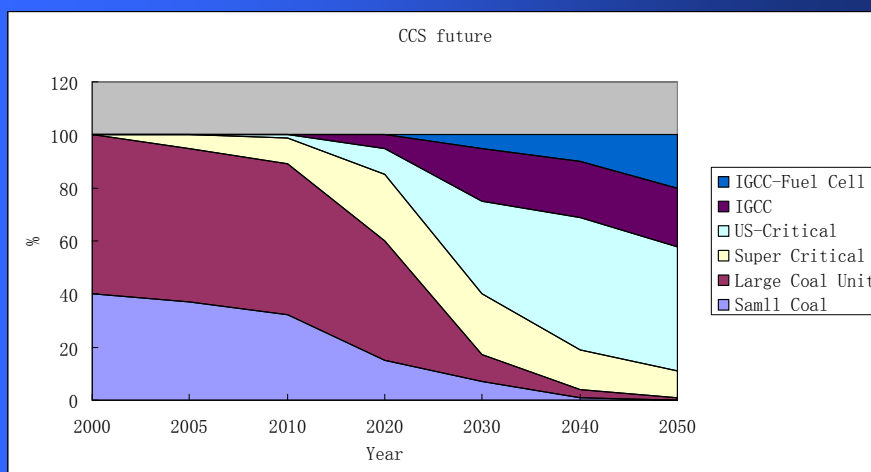


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Transformation: Power generation



Transformation: CCS

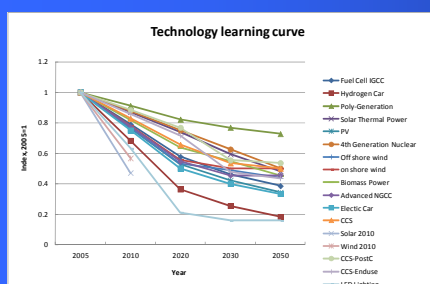


Good news

- Technology progress is much faster than our model says: learning curve effects
- High GDP growth could support low carbon development in China: all cost analysis in models are very small compared with GDP
- China's low carbon related technology manufacture is getting leading in the world: benefit for economy
- Local environment issues will be a very strong factor to go to clean production, nearly match with low carbon development

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Transformation: Technologies



By 2020, Wind 200GW to
250GW, Solar 50WG



荣威E50的长/宽/高分别为3569/1551/1540mm, 其定位为A00级紧凑型车。



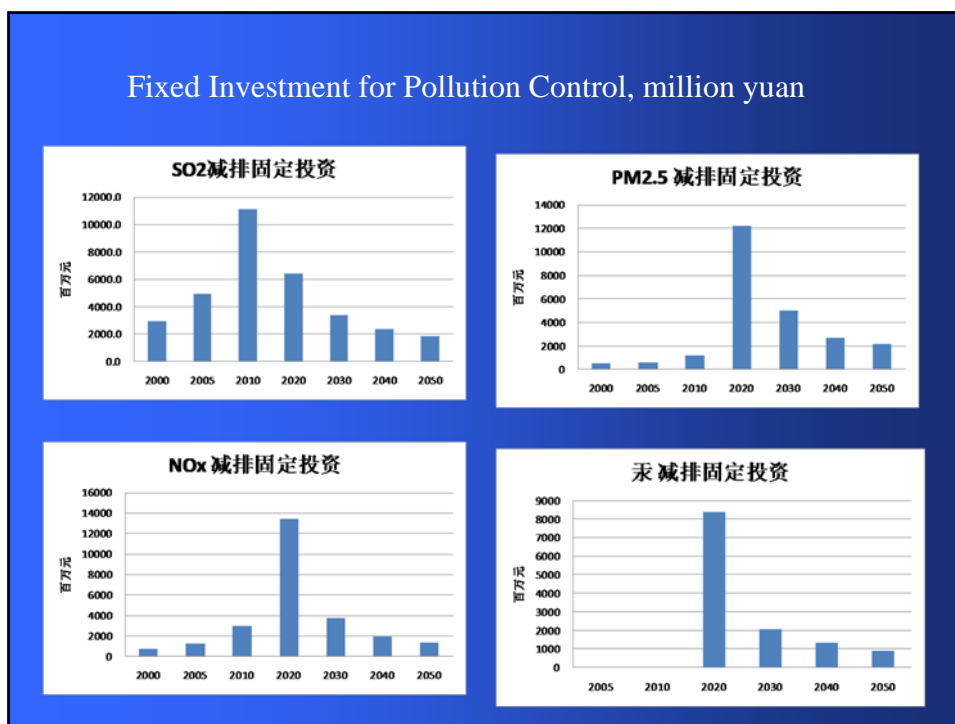
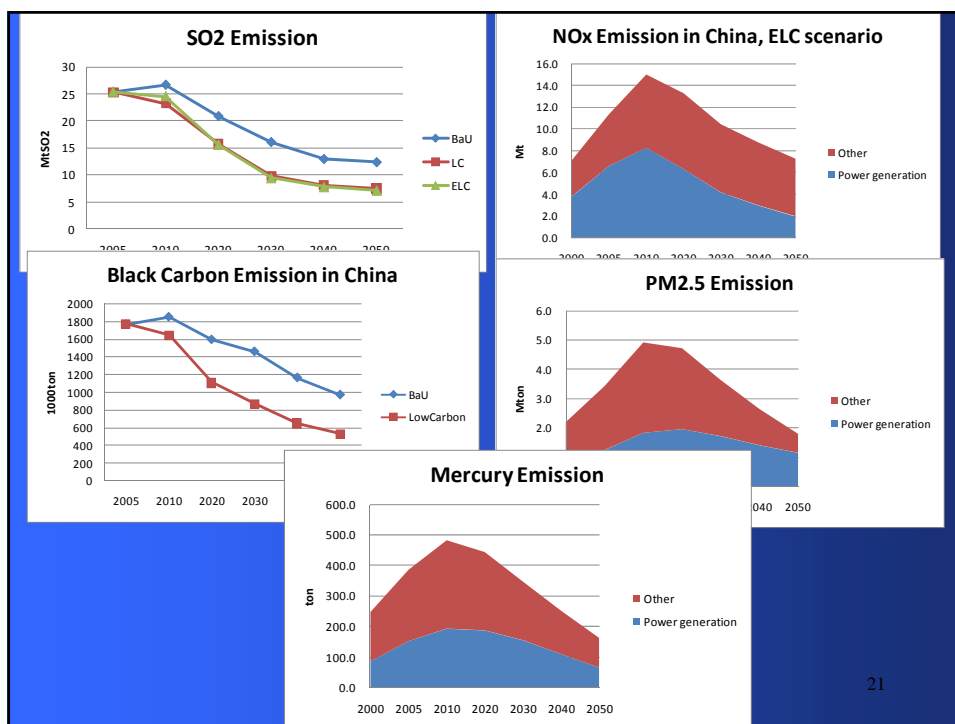
Price: US\$38000

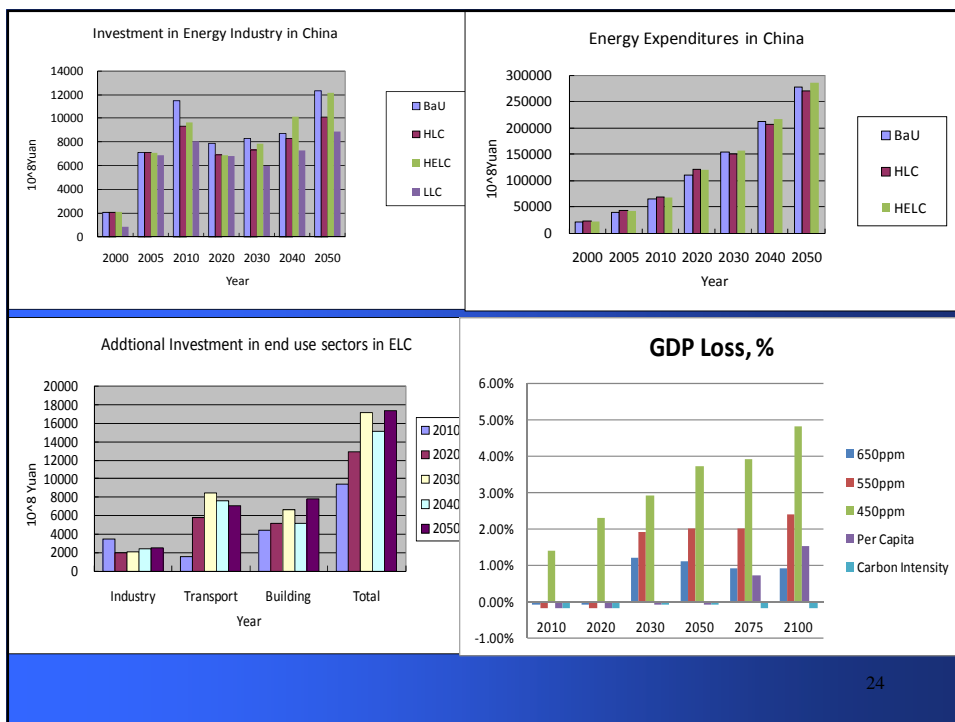
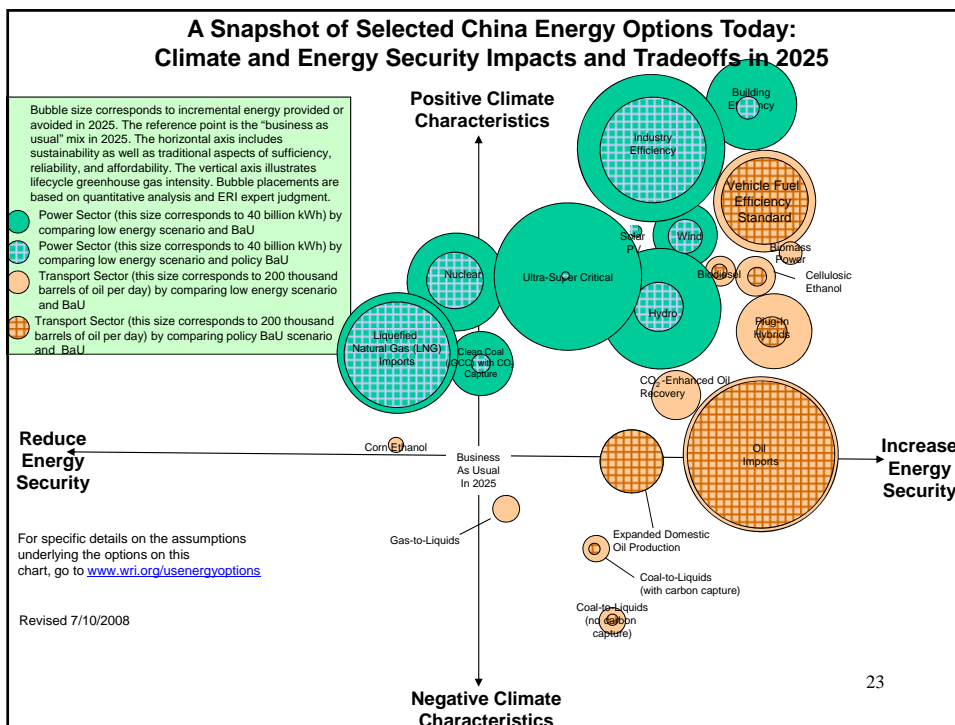
Subsidy: US\$15000(Shanghai), no need to apply number plate(cost US\$10000)

US\$18000(Beijing), no need to apply number plate(By Oct. 2012, 1.1 million people apply for 20000number plates per month),

The screenshot shows the JD.com website interface. At the top, there is a search bar with the text '平板电视机' (Flat Panel TV) and a search button. Below the search bar, there are navigation tabs for '全部商品分类', '首页', '服装城', '迷你挑', '团购', '守宝岛', and '在线游戏'. The main content area is divided into two sections. The left section shows search results for '平板电视机', with a sub-section for 'LED平板电视机'. The right section shows search results for '灯泡' (Light Bulbs). Both sections include filters for '品牌' (Brand), '价格' (Price), and '排序' (Sort), along with a list of product categories and specific product listings with images and prices.

The screenshot displays a grid of LED light bulb products. Each product listing includes an image of the bulb, its brand name, specifications (such as wattage and color temperature), and the current price. Some listings also feature star ratings and the number of reviews. The products are arranged in a grid format, with some items highlighted as '爆款' (Hot Item) or '限量' (Limited Edition). The background is a solid blue color.





POWER_BOX by Baosteel

2kW wind
10kW Solar PV



Challenges for short term energy system in China

- We are in a rapid change period, energy system need to response right now.
- But it is difficult to make change due to inertia. It could happen in decades in other countries, but maybe 5 to 10 years in China
- Coal peak before 2015? Coal fired power plant peak by 2013?
- Much more natural gas demand
- Energy pricing should be higher, and need public to accept(public education)
- There are still more space for new policies
- It could be a big movement in China's energy system, all aspects

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The expected big changes in energy system in China

- Coal consumption start to decrease, coal industry should be ready for it, and make own long-term strategy: local manufacture, export/import, security, clean coal use.
- Much more natural gas demand, need to work out for the supply
- Much faster progress on renewable energy, both centralized and distributed
- Grid should be reconstructed to support the system
- Energy price increase, to cover energy environment externality.
- Large scale of nuclear in
- Much lower growth rate for energy demand in China

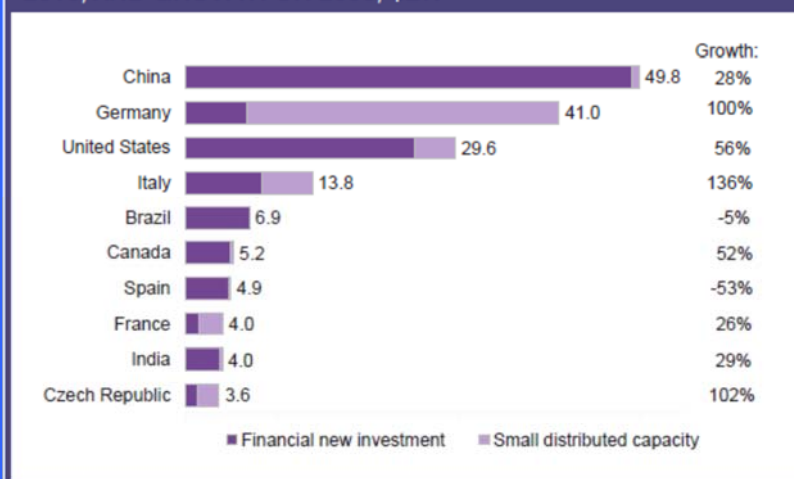
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Renewable Energy

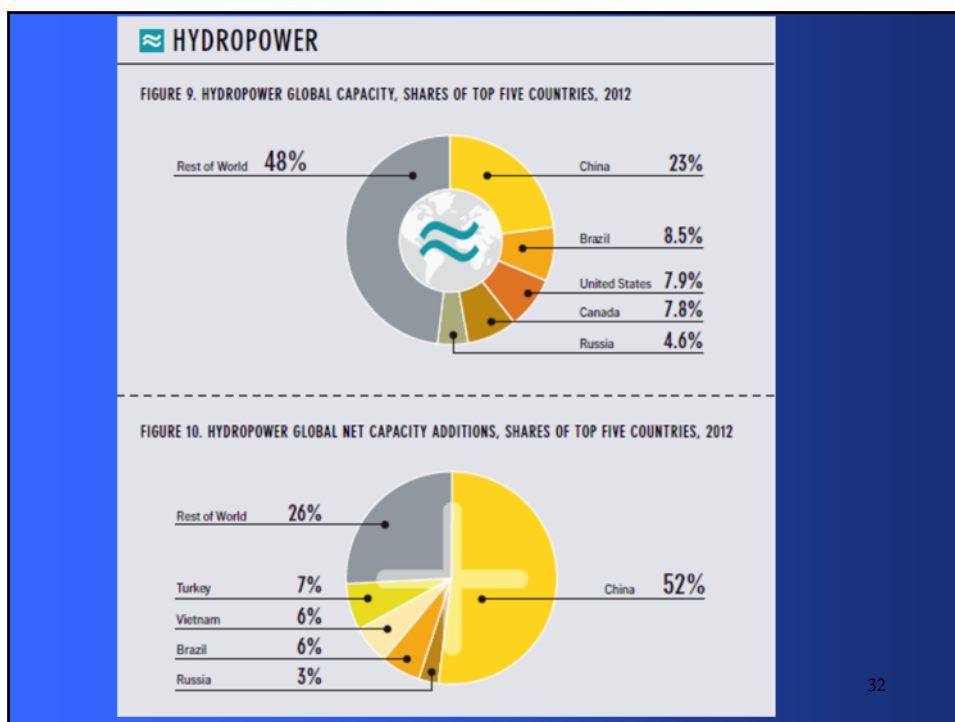
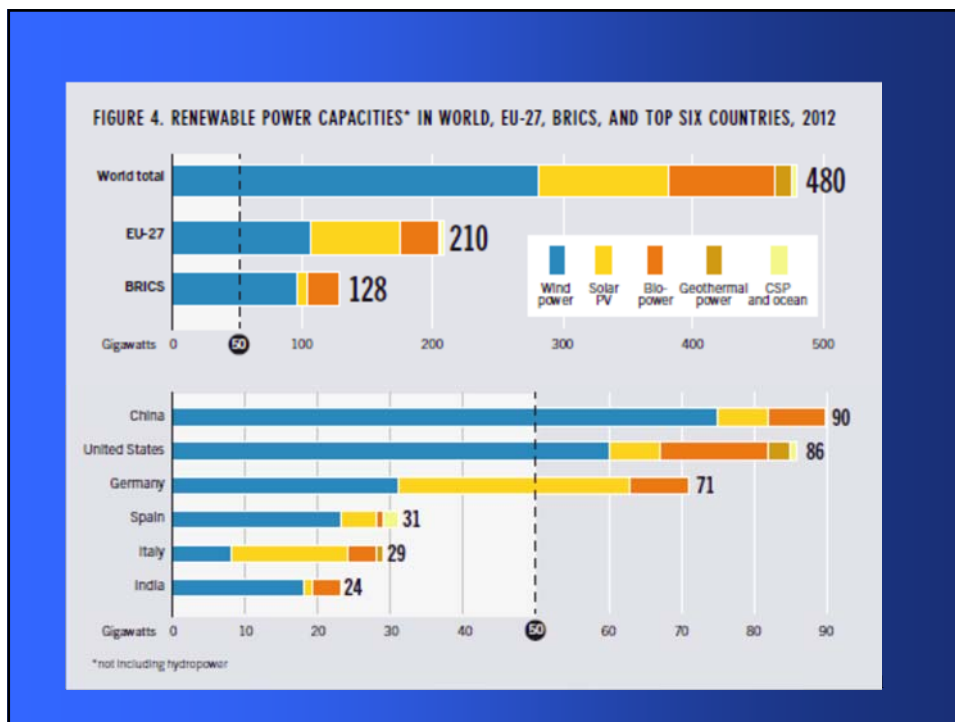
- Renewable Energy Planning 2006: wind 30GW, Solar 2GW by 2020
- 2009 Energy Bureau: Wind 80WG
- 2010 Energy Planning: Wind 150 GW, Solar 20GW by 2020
- 2013, the 12th Five Year Plan: 20GW of solar PV by 2015, 150GW wind
- February 2013, 35GW PV by 2015
- January 2014, 43GW by 2015
- Now: Wind 200GW to 300GW, Solar 50WG to 80 GW by 2020
- Based on the conclusion from Chinese Academy for Engineering, grid in China could adopt these renewable energy power generation in short term.

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FIGURE 11: FINANCIAL NEW INVESTMENT AND SMALL DISTRIBUTED CAPACITY IN RENEWABLE ENERGY BY COUNTRY, 2010, AND GROWTH ON 2009, \$BN



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SOLAR PHOTOVOLTAICS (PV)

FIGURE 11. SOLAR PV GLOBAL CAPACITY, 1995-2012

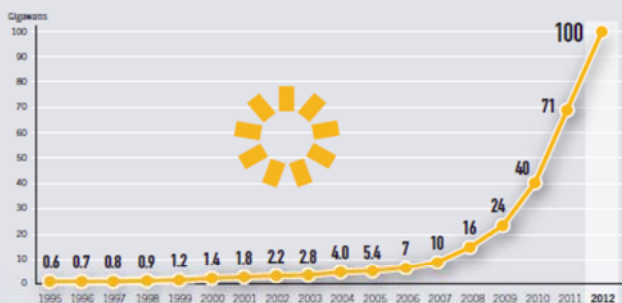
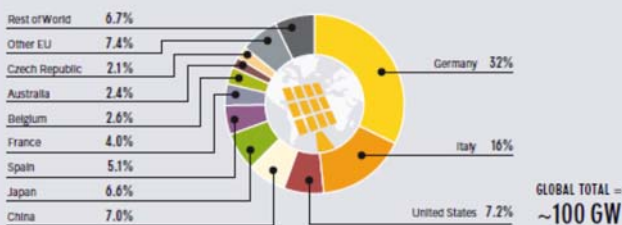


FIGURE 12. SOLAR PV GLOBAL CAPACITY, SHARES OF TOP 10 COUNTRIES, 2012



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SOLAR THERMAL HEATING

FIGURE 15. SOLAR WATER HEATING GLOBAL CAPACITY ADDITIONS, SHARES OF TOP 12 COUNTRIES, 2011

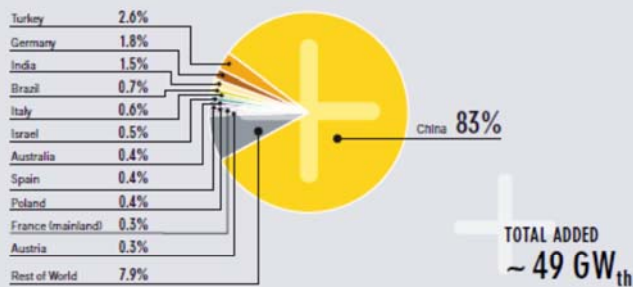
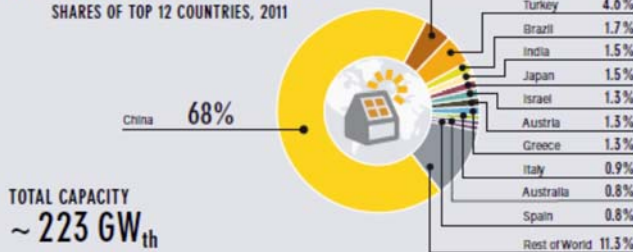
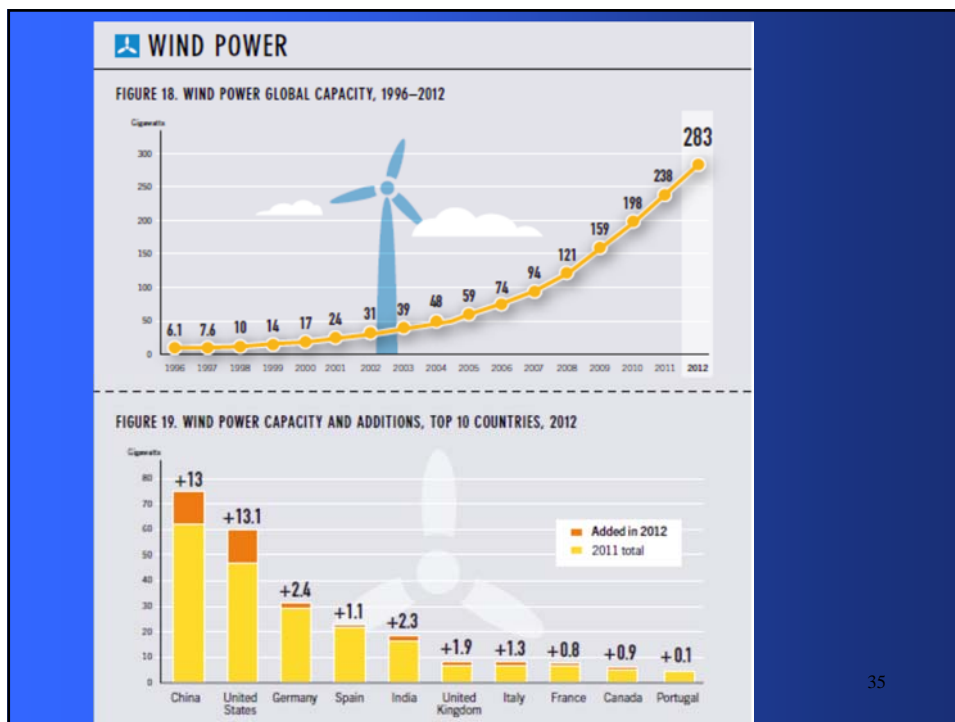


FIGURE 16. SOLAR WATER HEATING GLOBAL CAPACITY, SHARES OF TOP 12 COUNTRIES, 2011



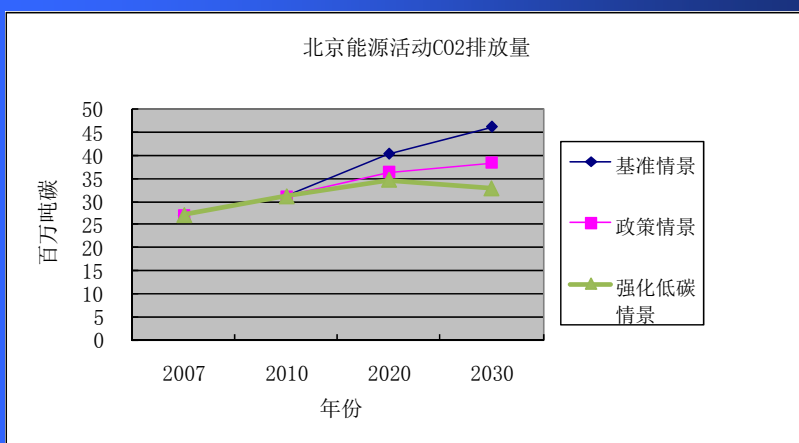
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Transformation: Low Carbon cities

Beijing CO2 emission from energy activities, Peak CO2 emission around 2015



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