

Overview of China Wind Power Industry, 2008

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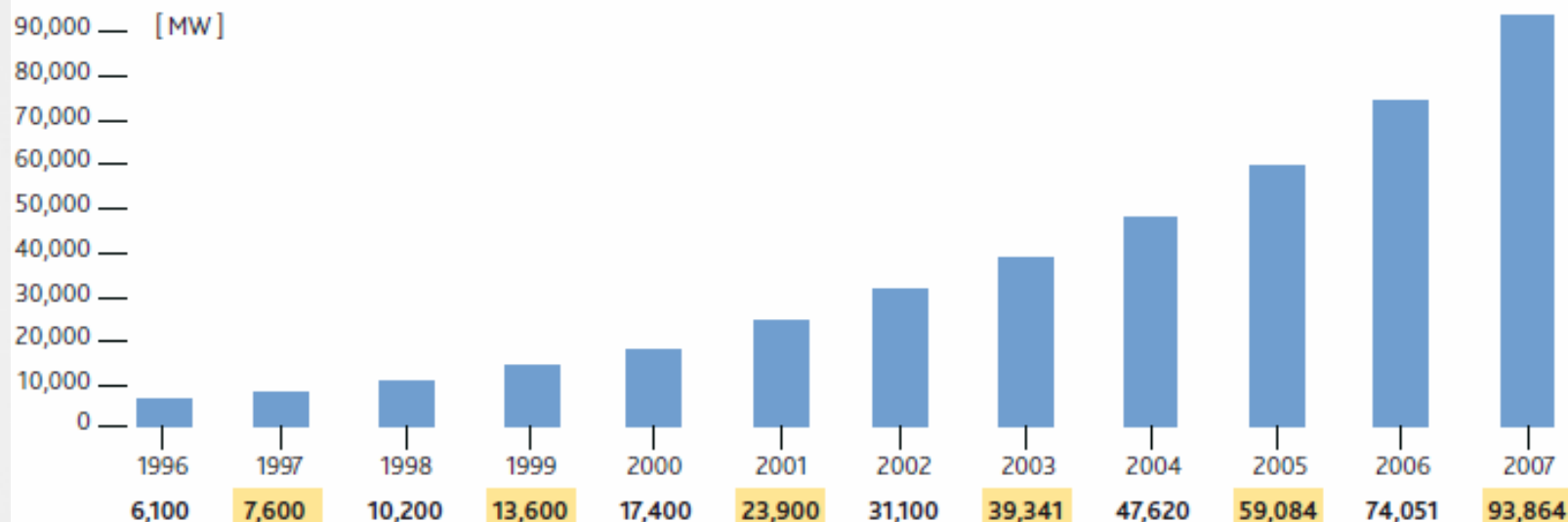
Risks & Opportunities

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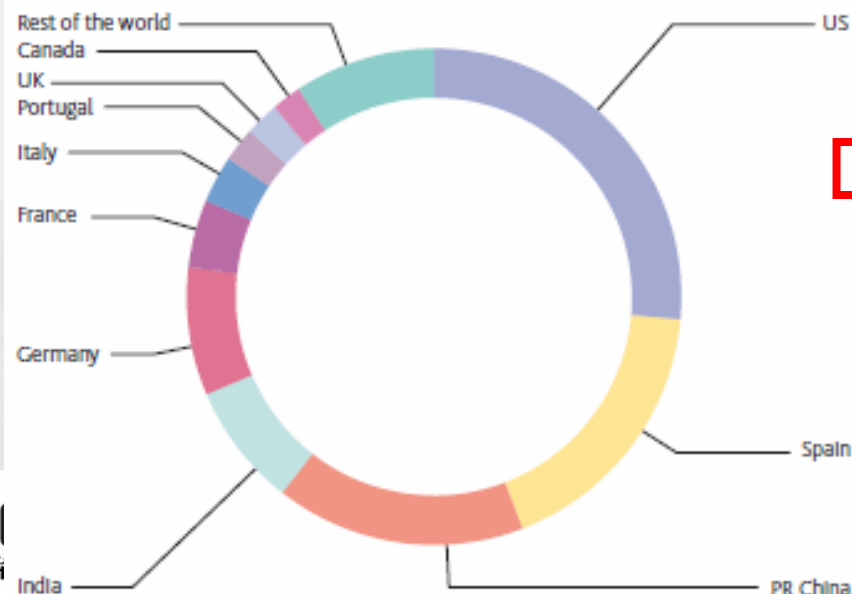
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China Wind Power Development

GLOBAL CUMULATIVE INSTALLED CAPACITY 1996-2007



TOP 10 NEW INSTALLED CAPACITY (JAN.-DEC. 2007)

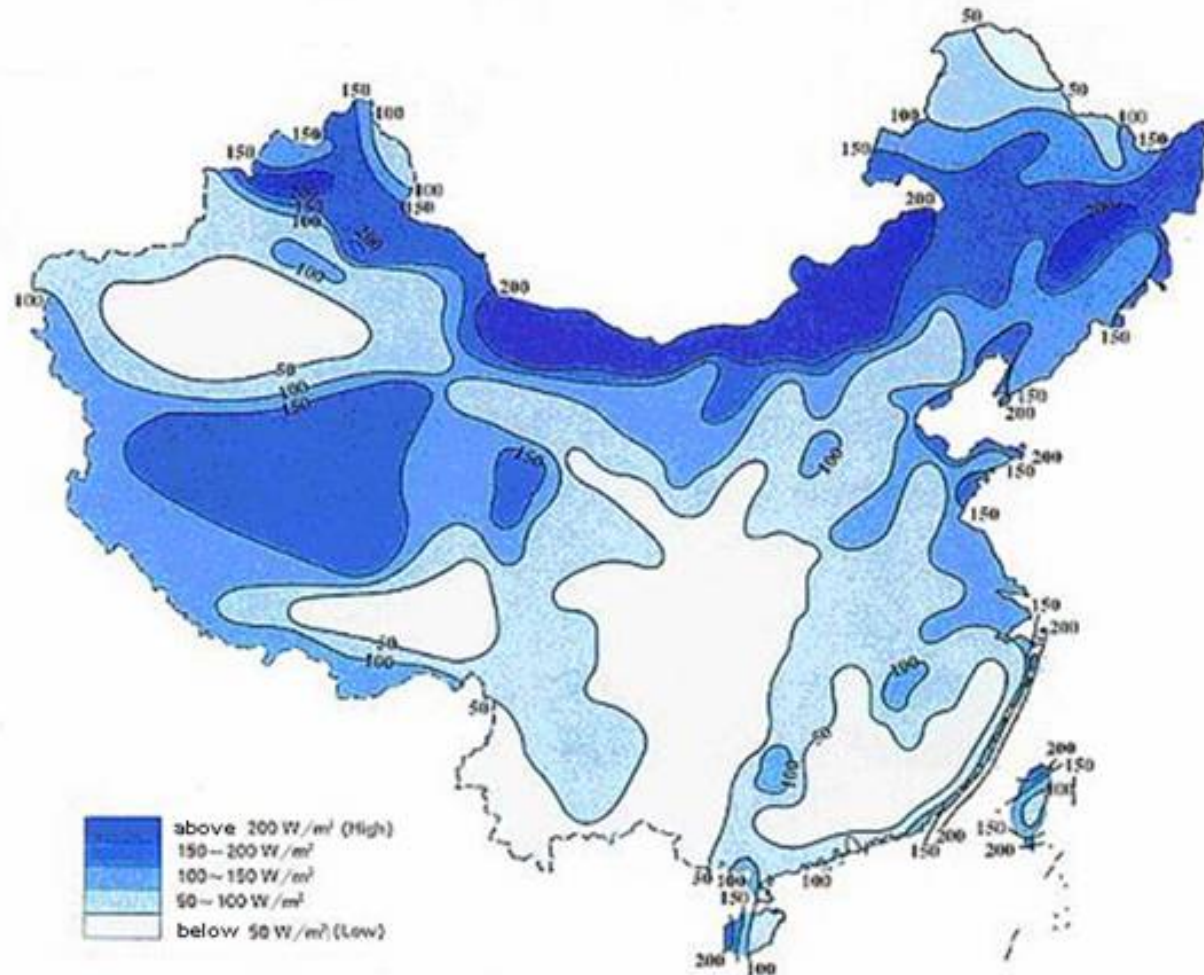


New capacity	MW	%
US	5,244	26.4
Spain	3,522	17.7
PR China	3,304	16.6
India	1,575	7.9
Germany	1,667	8.4
France	888	4.5
Italy	603	3.0
Portugal	434	2.2
UK	427	2.1
Canada	386	1.9
Rest of the world	1,815	9.1
Top 10 - Total	18,050	90.9
World total	19,864	100.0

Geographic Distribution of Wind Resource in China

In China, wind resources are mainly distributed in Northeast, Northwest and Huabei, as well as the off-shore areas in Southeast

According to China Meteorological Administration (CMA), the developable terrestrial area (10-meters high) is about 200,000 square km, with wind resource between 600 GW – 1,000 GW, and the developable off-shore area is about 157,000 square km, with wind resource between 100 GW – 200 GW



China Wind Farm Distribution

中国已建及部分拟建风电场分布图

Location of Existing and Some Projected Wind Farms in China



Provincial Distribution of Wind Farms

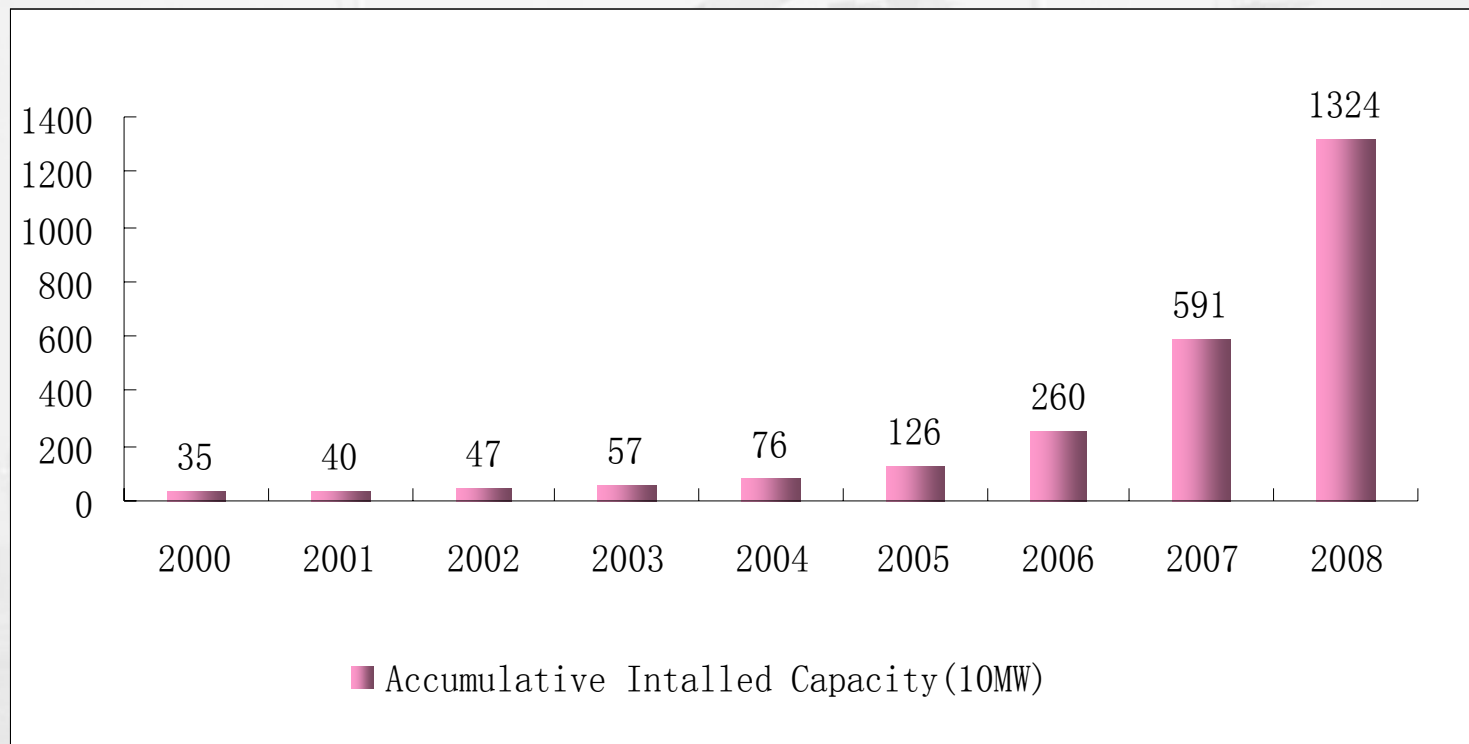
Provincial Distribution of Wind Farms, by the end of Apr, 2008

Type	Province	Accumulative Installed Capacity of Existing and Projected Wind Farms (Unit: MW)
Key Regions	Heibei	3000
	Inner Mongolia	4000
	Coastal Areas along Suzhou and Shanghai	2000
	Gansu	4000
	Jilin	1000
	Liaoning	1000
	Xinjiang Uygur Autonomous Region	1000
	Subtotal	16000
General Regions	Shandong	600
	Guangdong	600
	Ningxia Hui Autonomous Region	500
	Fujian	400
	Heilongjiang	200
	Zhejiang	250
	Shanxi	250
	Subtotal	2800
Other Regions		1200
Total		20000

China Cumulative Installed Capacity

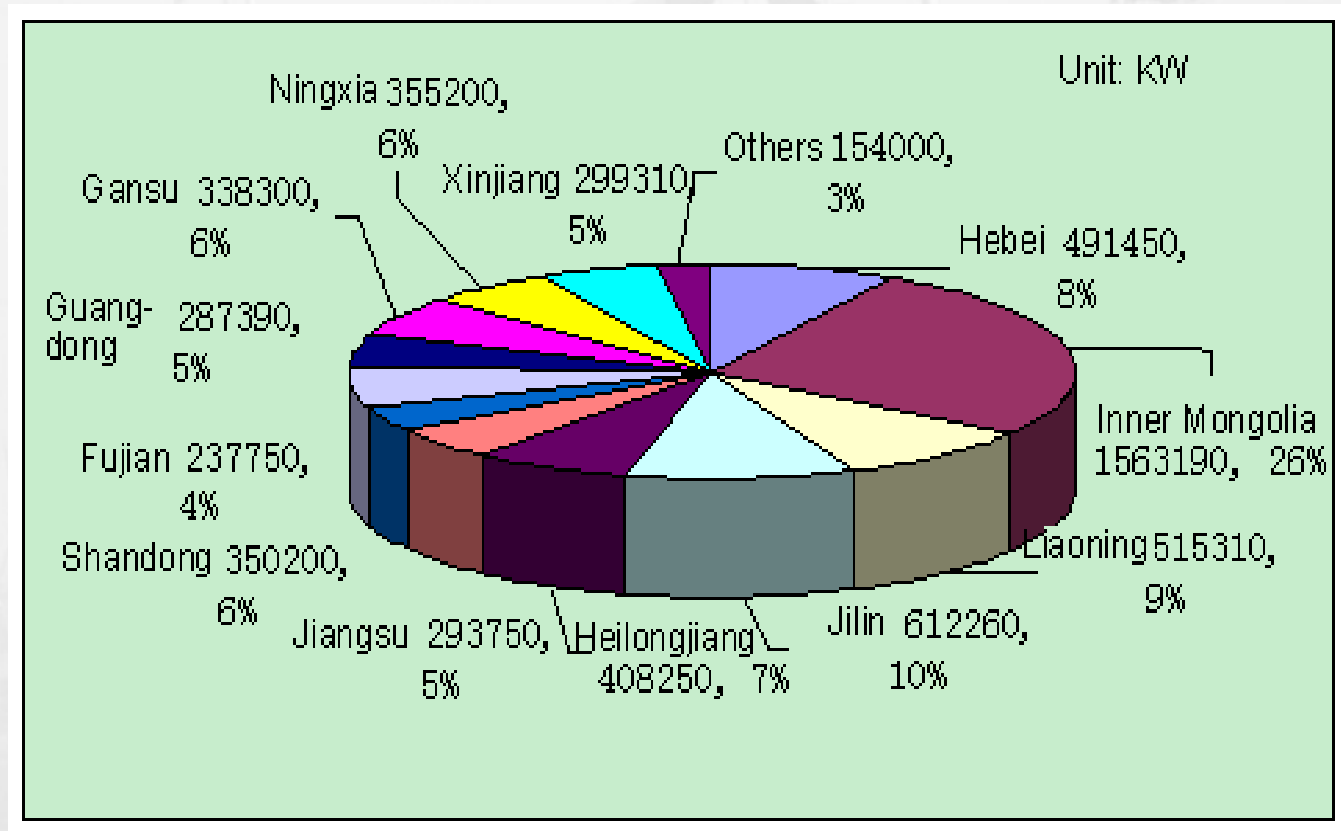
By the end of 2008, China's accumulative installed capacity has reached 13.24 GW, the new installed capacity was 7.33 GW during the year.

China's accumulative installed capacity, 200-2008



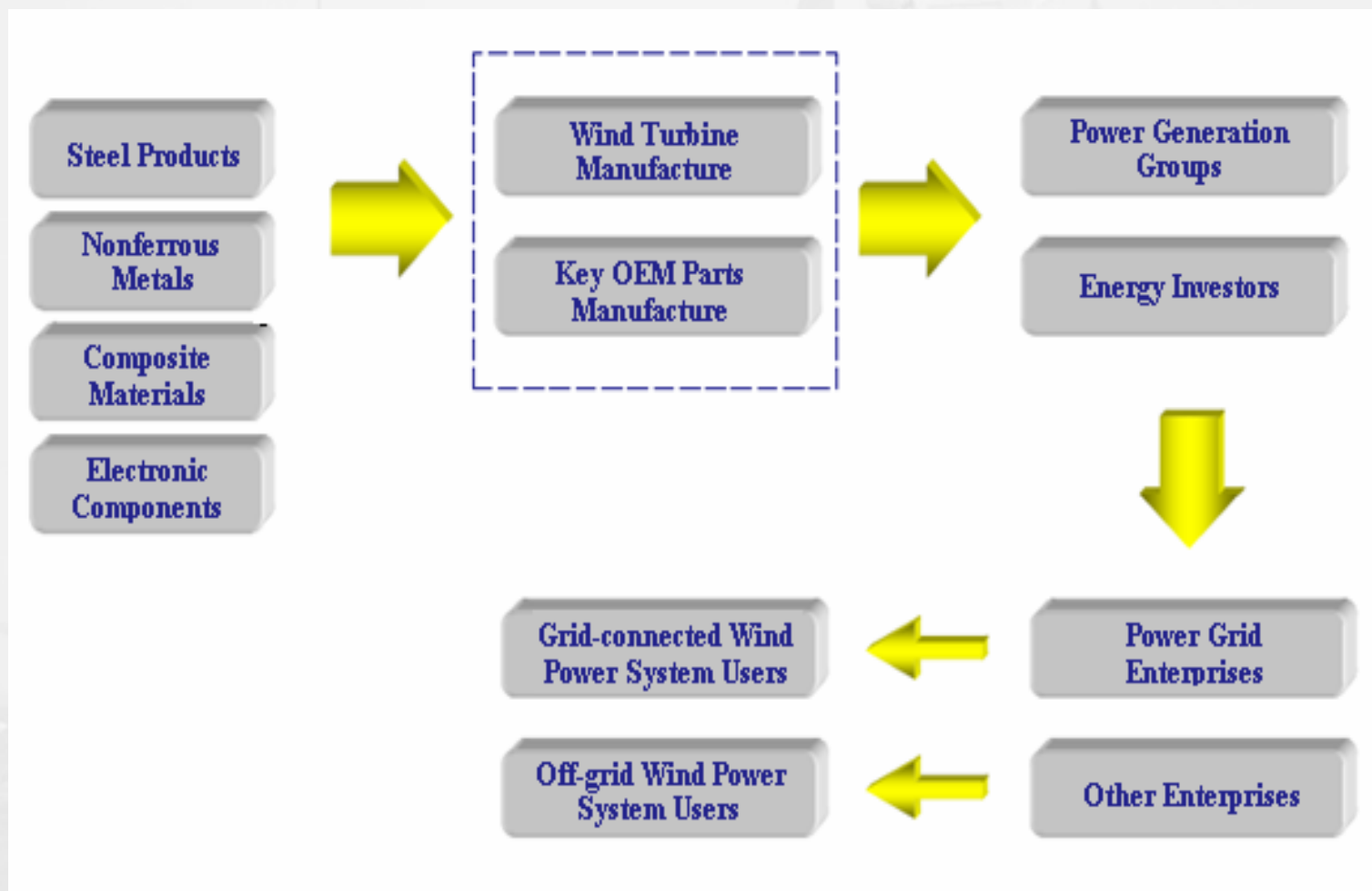
China Regional Installed Capacity

- ❖ By the end of 2007, according to the accumulative installed capacity, the top five provinces in China was Inner Mongolia, Jiling, Liaoning, Hebei and Heilongjiang.



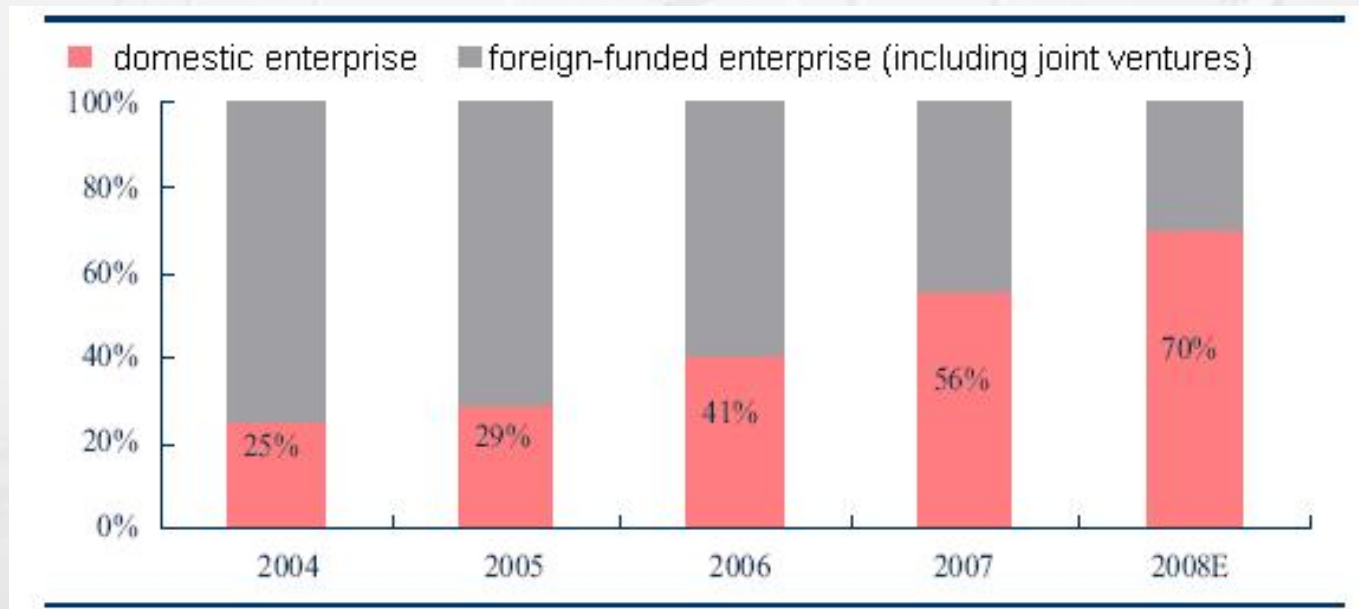
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China Wind Power Industry Chain Structure



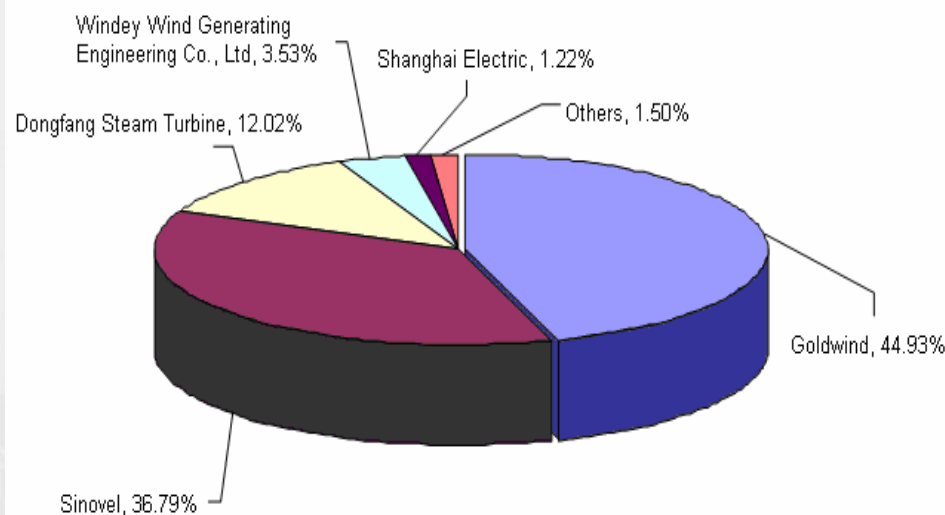
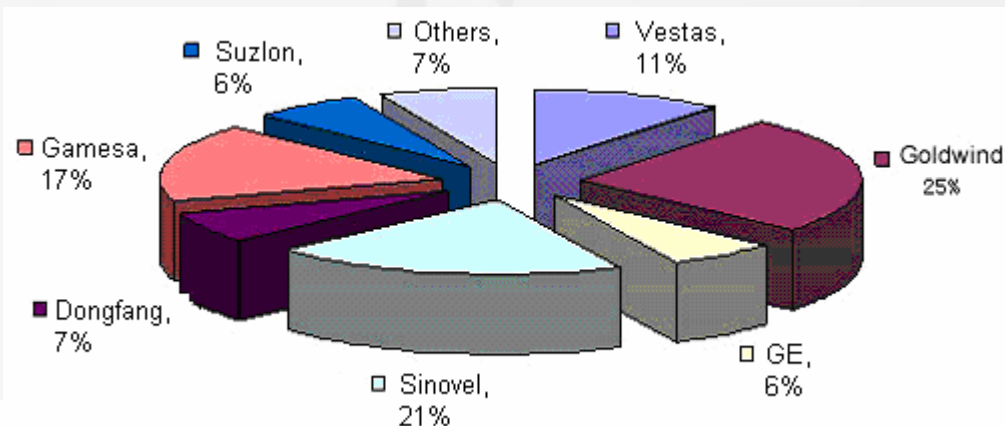
China Turbine Manufacturers

- ❖ In 2008, the quantity of domestic turbine manufacturer has dramatically increased to 70 from only 6 in 2004, their overall market share climbed to 56% in 2007 from 25% in 2004, and the figure is expected to reach about 70% in 2008.



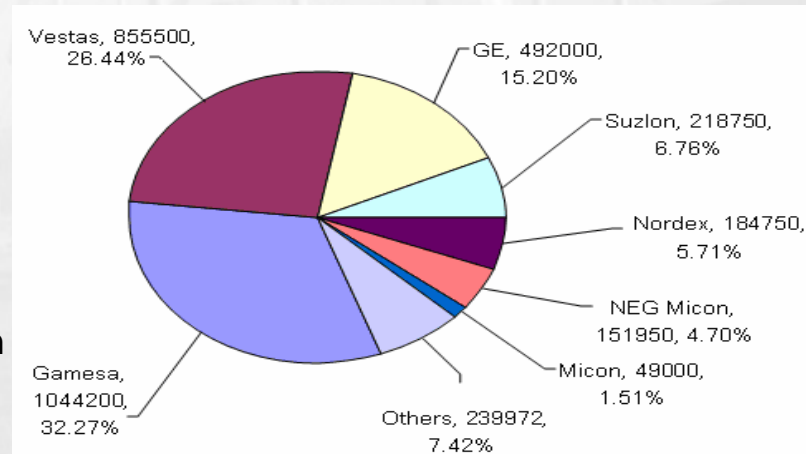
Share Distribution of Turbine Manufacturers

Market Share Distribution of Wind Turbine Manufacturers in China, 2007



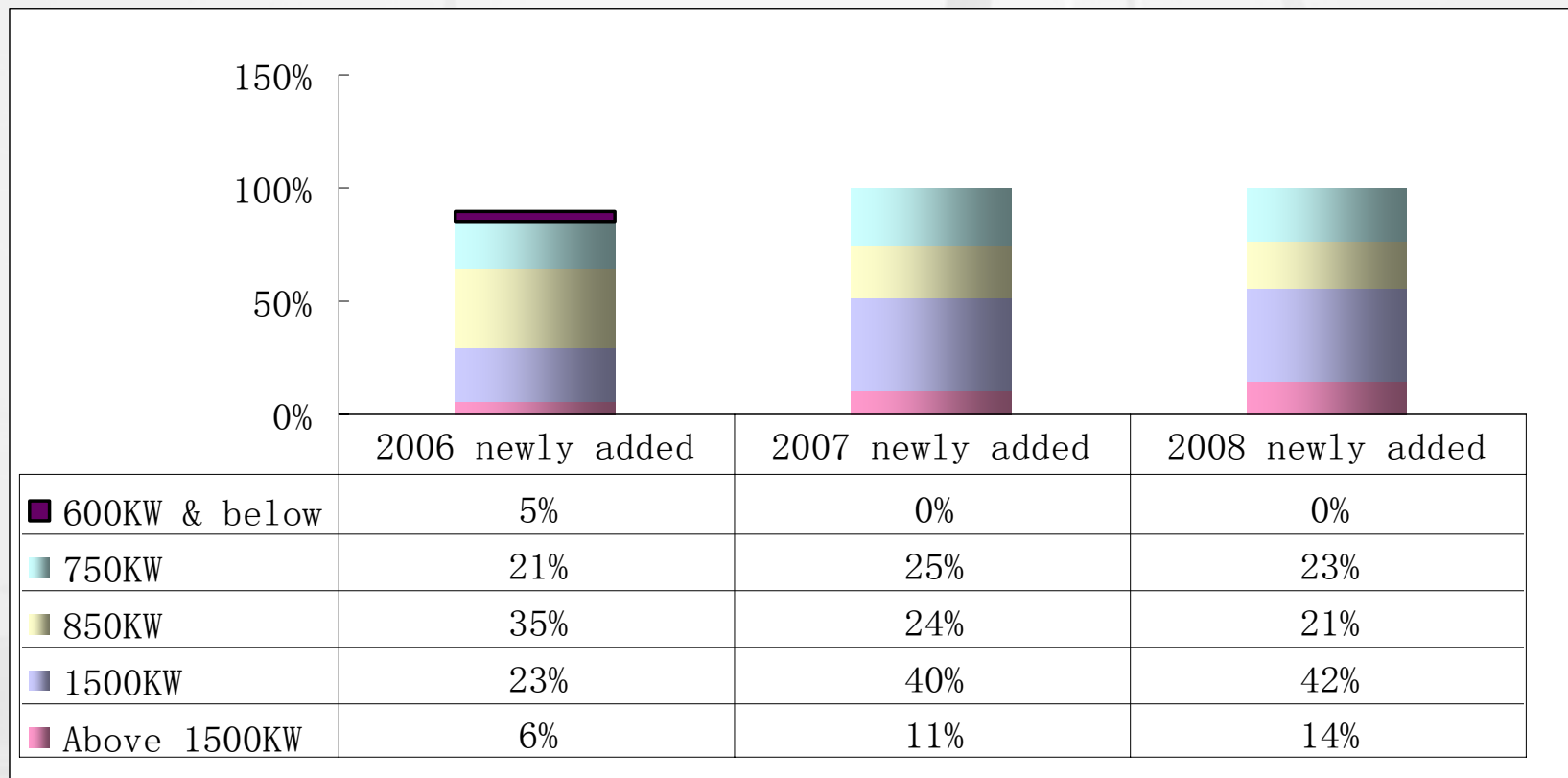
Chinese Market Share Distribution Among Foreign Turbine Manufacturers in 2007

Market Share Distribution Among Domestic Turbine Manufacturers in 2007



Proportion of Various Turbines

Newly-Added Proportion of Various Turbine according to Output Power



Equipment Market -- Goldwind

Performance of Goldwind, 2005-2008

Spec.		2005	2006	2007	2008E
600KW	Selling price (CNY10,000/KW)	0.34	0.34	---	---
	Sales revenue (CNY10 mln)	28.5	5.0	---	---
750KW	Selling price (CNY10,000/KW)	0.37	0.38	0.38	0.36
	Sales revenue (CNY100 mln)	21.2	146.4	250.5	378
1500KW	Selling price (CNY10,000/KW)	---	---	0.58	0.5
	Sales revenue (CNY10 mln)	---	---	69.7	240
Total	Total sales revenue (CNY10 mln)	49.8	151.4	320.2	618
	Gross profit margin	27.2%	30.5%	28.1%	23.3%
	Growth rate		204.2%	111.5%	93.0%

Output of Goldwind, 2005-2008

Spec.		2005	2006	2007	2008E
600KW	Output (set)	139	25	---	---
	Output (KW)	83,400	15,000	---	---
750KW	Output (set)	76	514	890	1,400
	Output (KW)	57,000	385,500	667,500	1,050,000
1500KW	Output (set)	---	---	80	320
	Output (KW)	---	---	120,000	480,000

Equipment Market -- Dongfang Electric

	2007	2008E	2009E	2010E
Sales volume (sets)	200	700	1,000	1,200
Sales volume (10 MW)	30	105	150	180
Average price (CNY million/MW)	6	6	5.8	5.8
Sales revenue (CNY million)	1,800	6,300	8,700	10,440
Gross profit	8%	20%	22%	25%
Cost (CNY million)	1,656	5,040	6,786	7,830
Net profit margin	-1%	6%	7%	8%
Net profit (CNY million)	-18	378	609	835

Dongfang Electric's Sales on Wind Turbine, 2007-2010

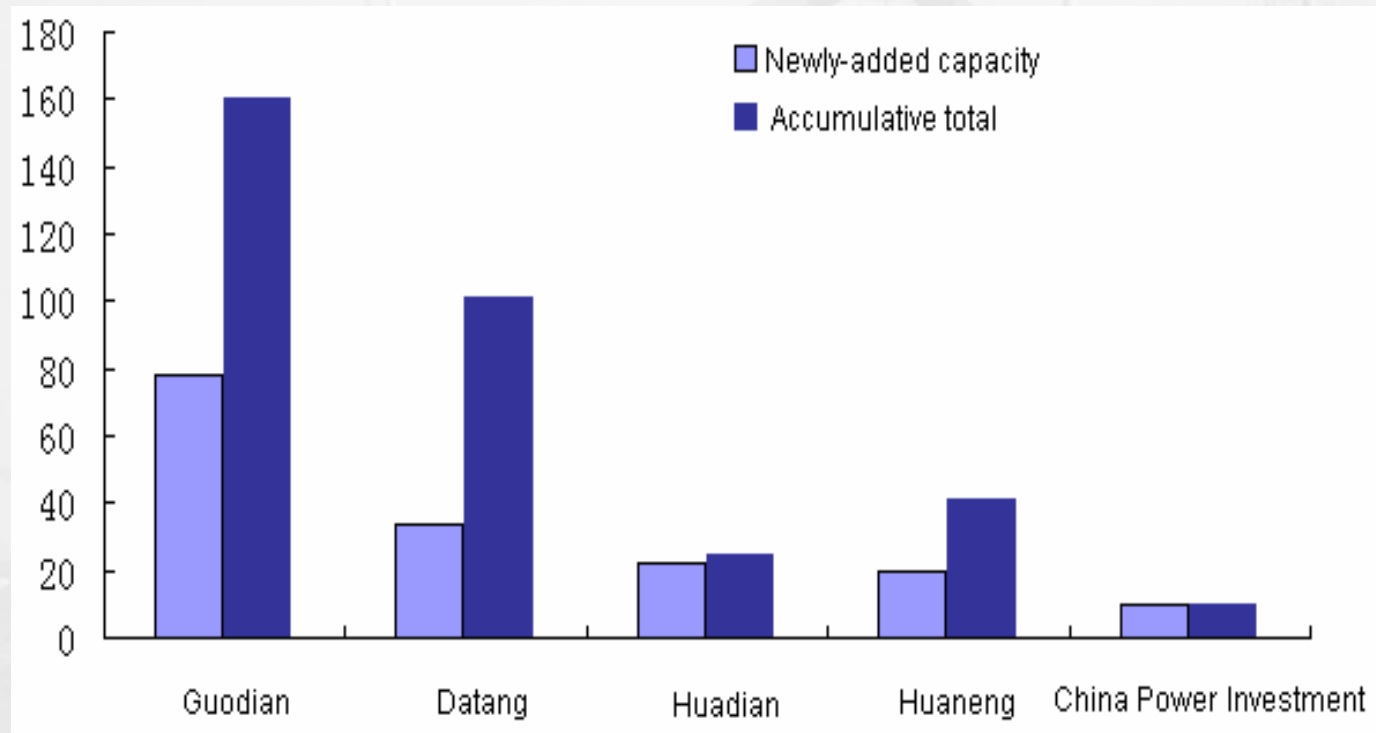
Part & Component Vendors for Dongfang Electric Corporation

Blade	Baoding Huiteng/Shanghai FRP Research Institute/Dongfang Steam Turbine Works
Gear box	Nanjing High-Speed & Accurate Gear /CQ Gearbox/China Erzhong
Spindle (bearing, coupling)	Spindle: Dongfang Steam Turbine Works; Bearing: SKF/FAG/ Bearing: SKF/FAG/Jingye/Wafangdian Bearing
Motor	Yongji/Lanzhou/Dongfeng/Nanyang/Tianyuan/XEMC
Yaw Control System	Yaw motor: Nanjing High-speed & Accurate Gear; Yaw bearing: XREB/Wangfangdian Bearing/Tianma Bearing
Central Monitoring System	Import
Electric Control System	Import
Hydraulic System	Dongfang Steam Turbine Works
Wheel (including variable propeller)	Wheel: Dongfang Steam Turbine Works; Variable propeller: LUST/SSB
Engine Room (include cover)	Self-made

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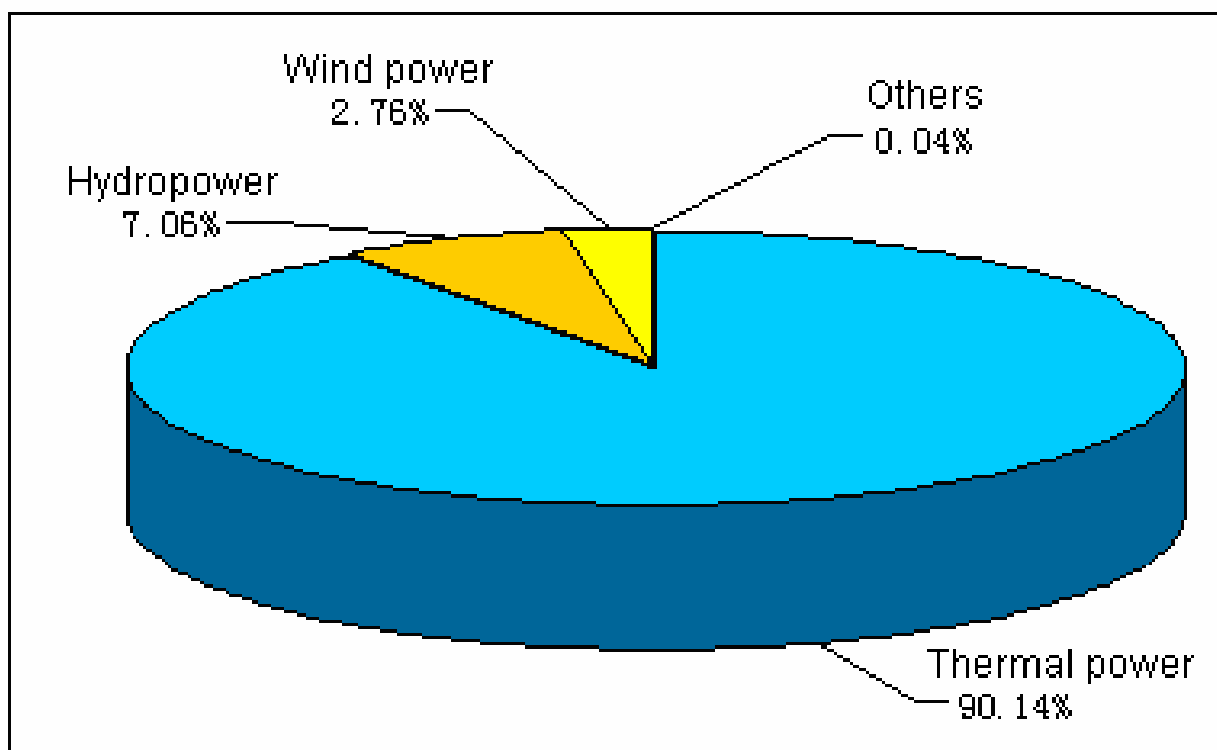
China Power Generation Groups

New Installed Capacity of China's Five Power Generation Groups in 2007
Unit: 10,000KW



Guodian Group's Installed Capacity

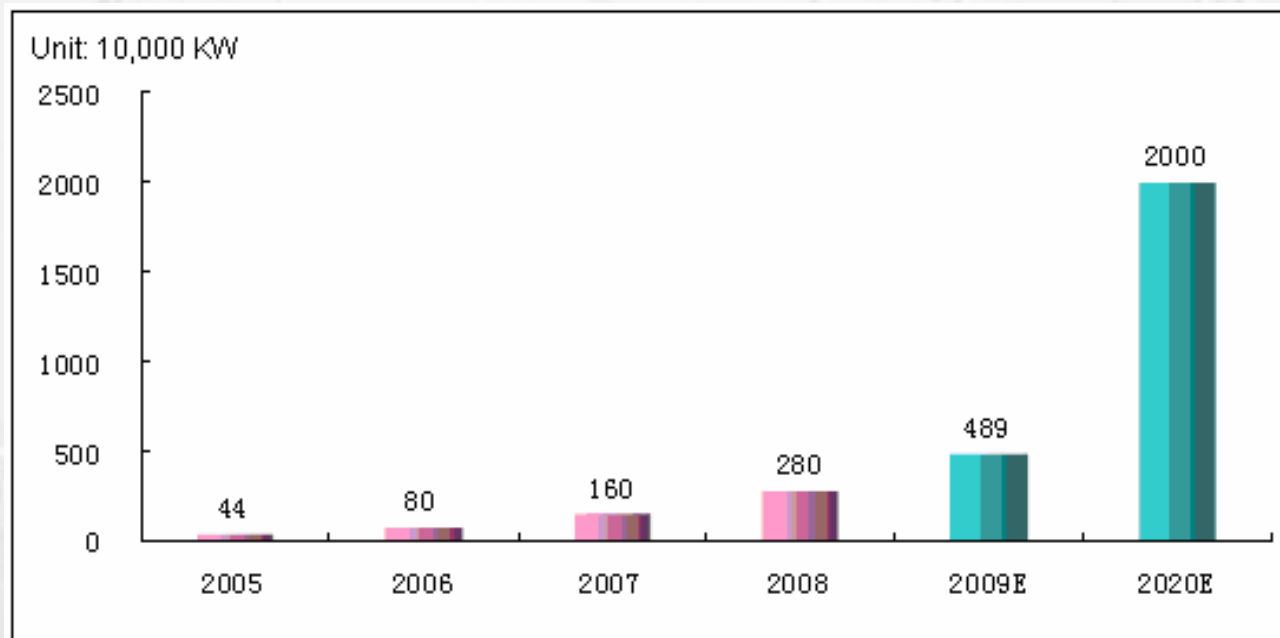
Installed Electric Power Capacity Distribution of China Guodian, by the end of Jun, 2008



Performance of Longyuan

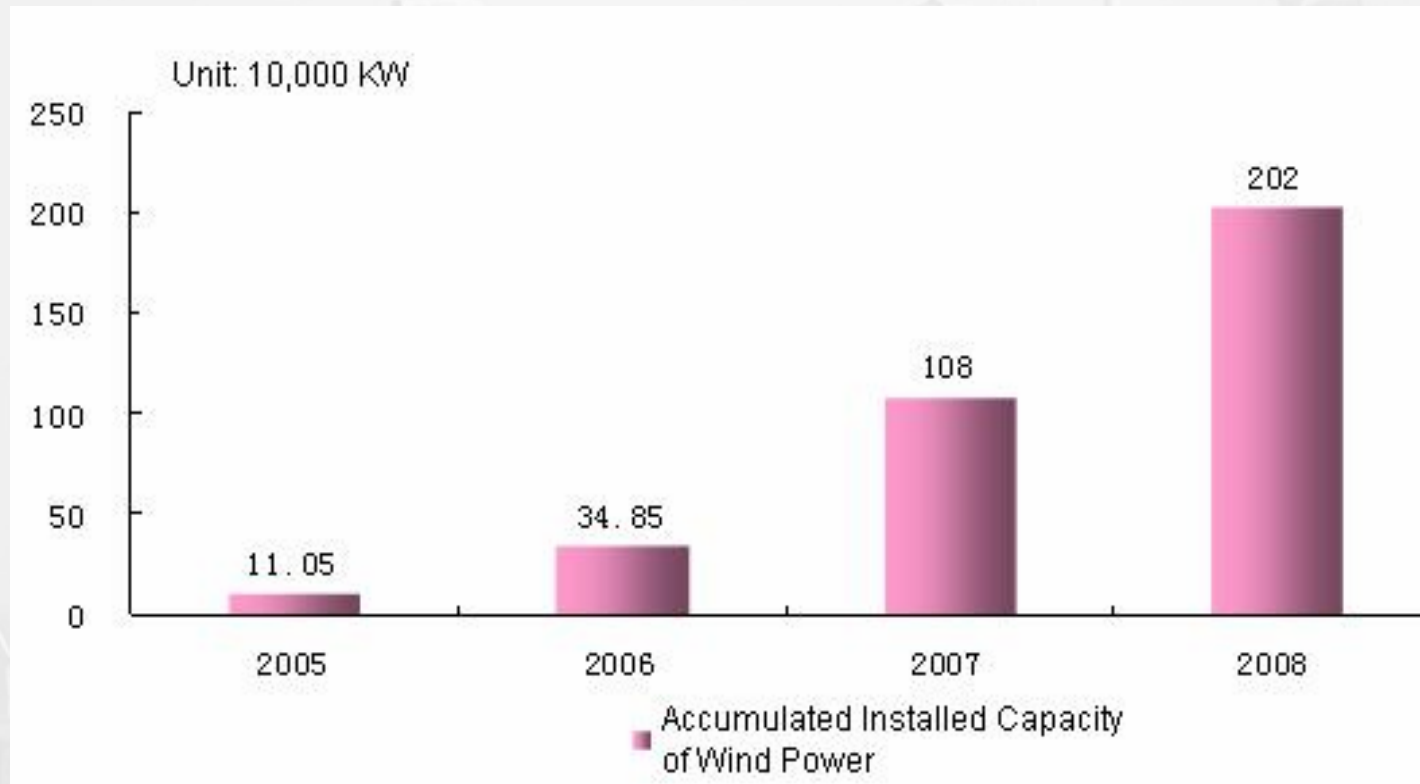
Longyuan Electric Power Group Corporation is the key subsidiary of Guodian Group which focus on wind power development, by Dec 2008, it had one fourth of China's total installed capacity.

The Accumulative Installed Capacity of Longyuan, 2005-2020E



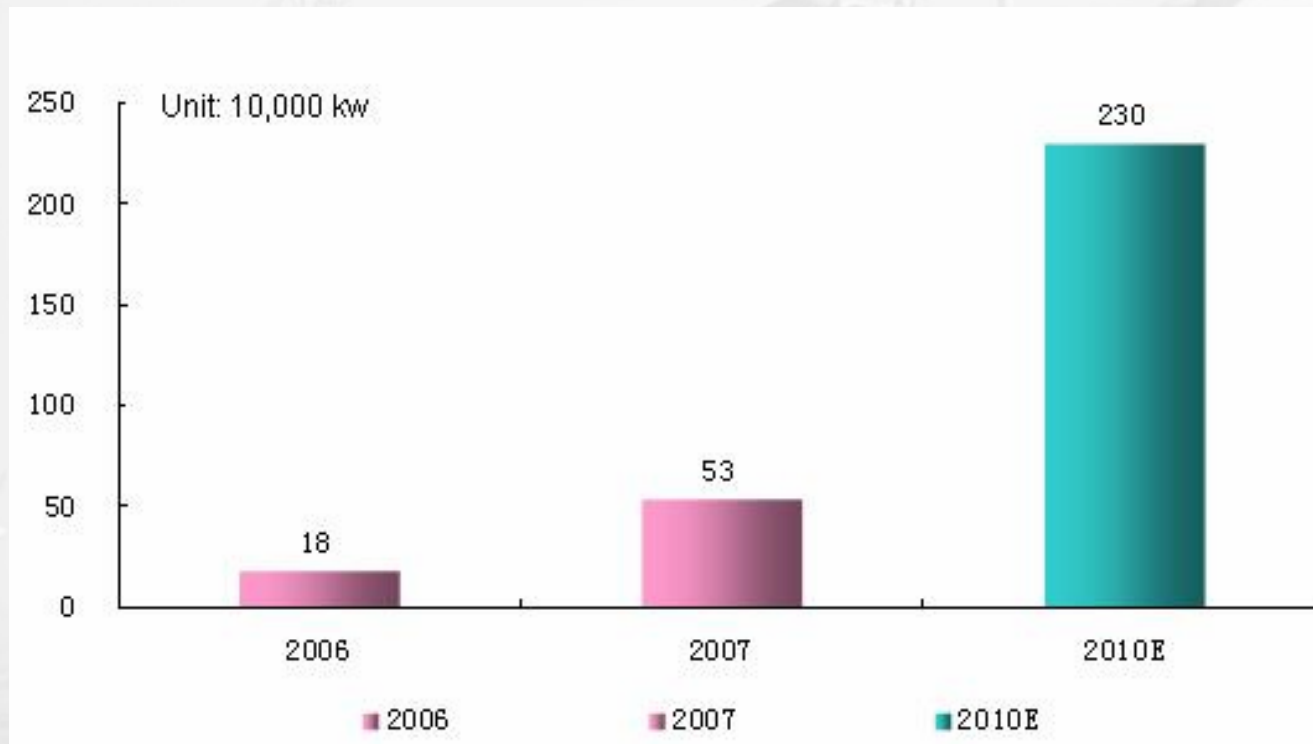
Datang Group's Installed Capacity

❖ *Accumulative Installed Capacity of Datang Group, 2005-2008*



Huaneng group's Installed Capacity

❖ *Accumulative Installed Capacity of Huaneng Group, 2006-2010E*



Huadian Group's Installed Capacity

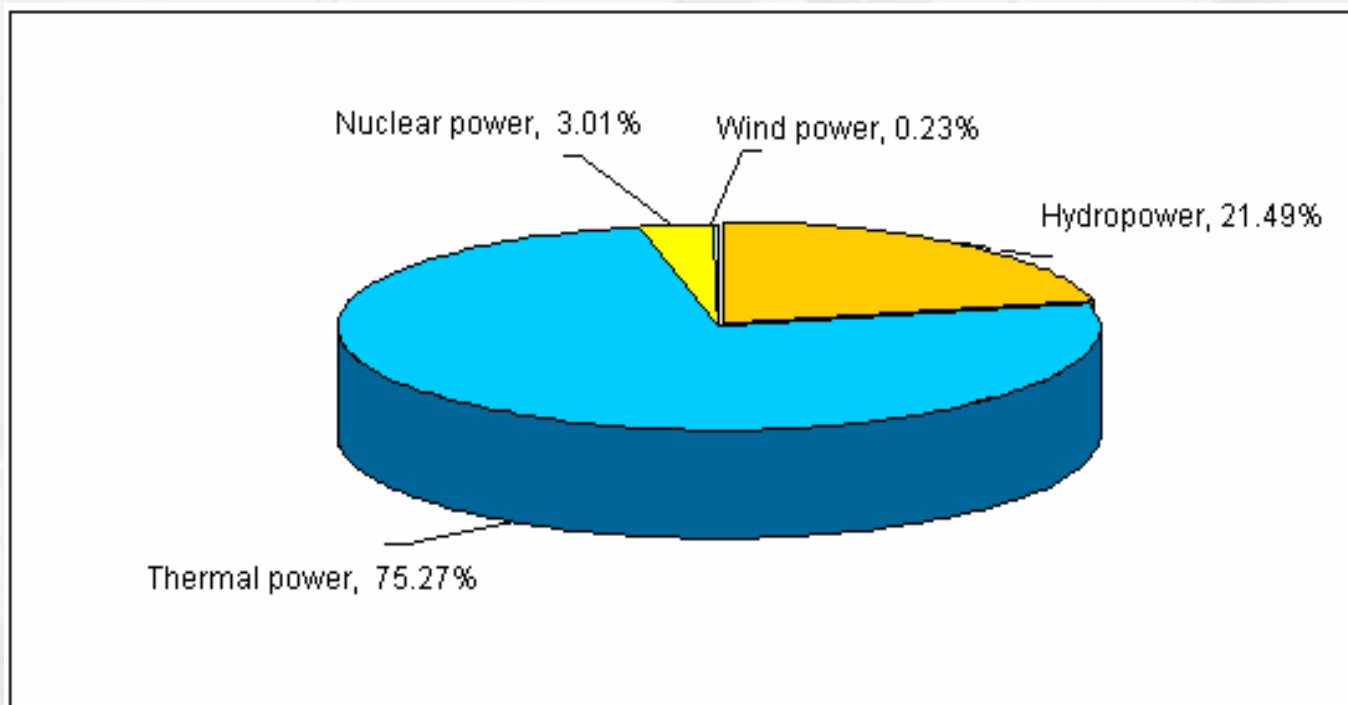


Accumulative Installed Capacity of Huadian Group, 2006-2010E



China Power Investment Group's Installed Capacity

Installed Electric Power Capacity Distribution of China Power Investment Group in 2007



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China Wind Power Industry Risks

- ❖ Tense cash flow of Power Generation Groups
- ❖ CDM Price Declining of Wind Power Projects
- ❖ Starting from October 2008, power generation has shown a negative growth, and the gap between the generating cost of wind power and traditional energies will be widened together with the price drop of steam coal.

China Wind Power Industry Opportunities

- ❖ Since China wind power market is led by the government, 80% of the market goes to large state-owned electric power groups. In this sense, the mentioned risks above impose no effect on the sound development of wind power industry.
- ❖ Judging from wind power manufacturers at present, the global financial crisis and domestic economic slowdown has not exerted great influence on the demand for wind power yet, on the contrary, the style transition of value added tax and the policies for securing economic growth will further spur the demand. In medium and long term, the style transition of value added tax will increase the tax credit which is brought by equipment procurement of wind farms, thereby improving the internal rate of return of wind power operation and stimulating the demand for wind power equipments.
- ❖ As long as the economic growth can be sustained, the government is likely to issue more preferable policies for wind power industry to shore up the investments into new energies. National Development and Reform Commission probably promotes the goal of installed wind power capacity in 2020 from 30 GW to 100 GW.
- ❖ In addition, the cost pressure of wind power manufacturers will be lighted with the declining prices of raw materials like steel.

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- ❖ China Wind Power Industry Report, 2008
- ❖ <http://www.researchinchina.com/Htmls/Report/2009/5630.html>
- ❖ China Wind Power Equipment Market Report, 2008
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- ❖ China Wind Power Equipment Manufacturing Report, 2007
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