China New Energy Sector Outlook

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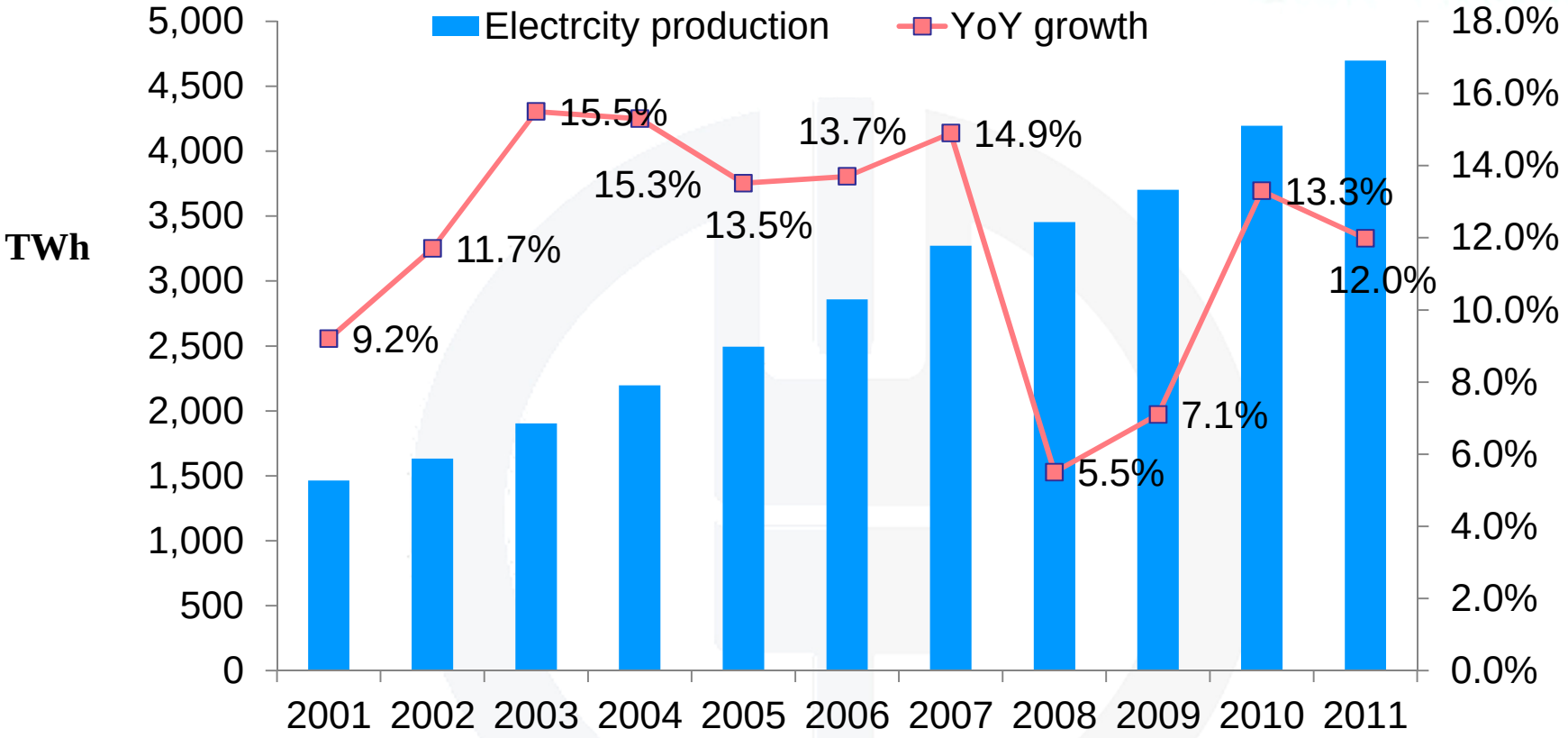
Wind Industry Overview

WTG manufacturers and Wind farm operators

Outlook and Comparison

Wind Industry Overview

China Power Generation



Source: China Electric Council, NBSC

China Real GDP growth

	Real GDP YoY Growth	Power Generation YoY Growth	Elasticity ratio
2001	8.3%	9.2%	1.11
2002	9.1%	11.7%	1.29
2003	10.0%	15.5%	1.55
2004	10.1%	15.3%	1.52
2005	10.4%	13.5%	1.30
2006	11.6%	13.7%	1.18
2007	13.0%	14.9%	1.15
2008	9.6%	5.5%	0.57
2009	9.1%	7.1%	0.77
2010	10.0%	13.3%	1.33
2011	9.20%	12.0%	1.30
Average			**1.19**

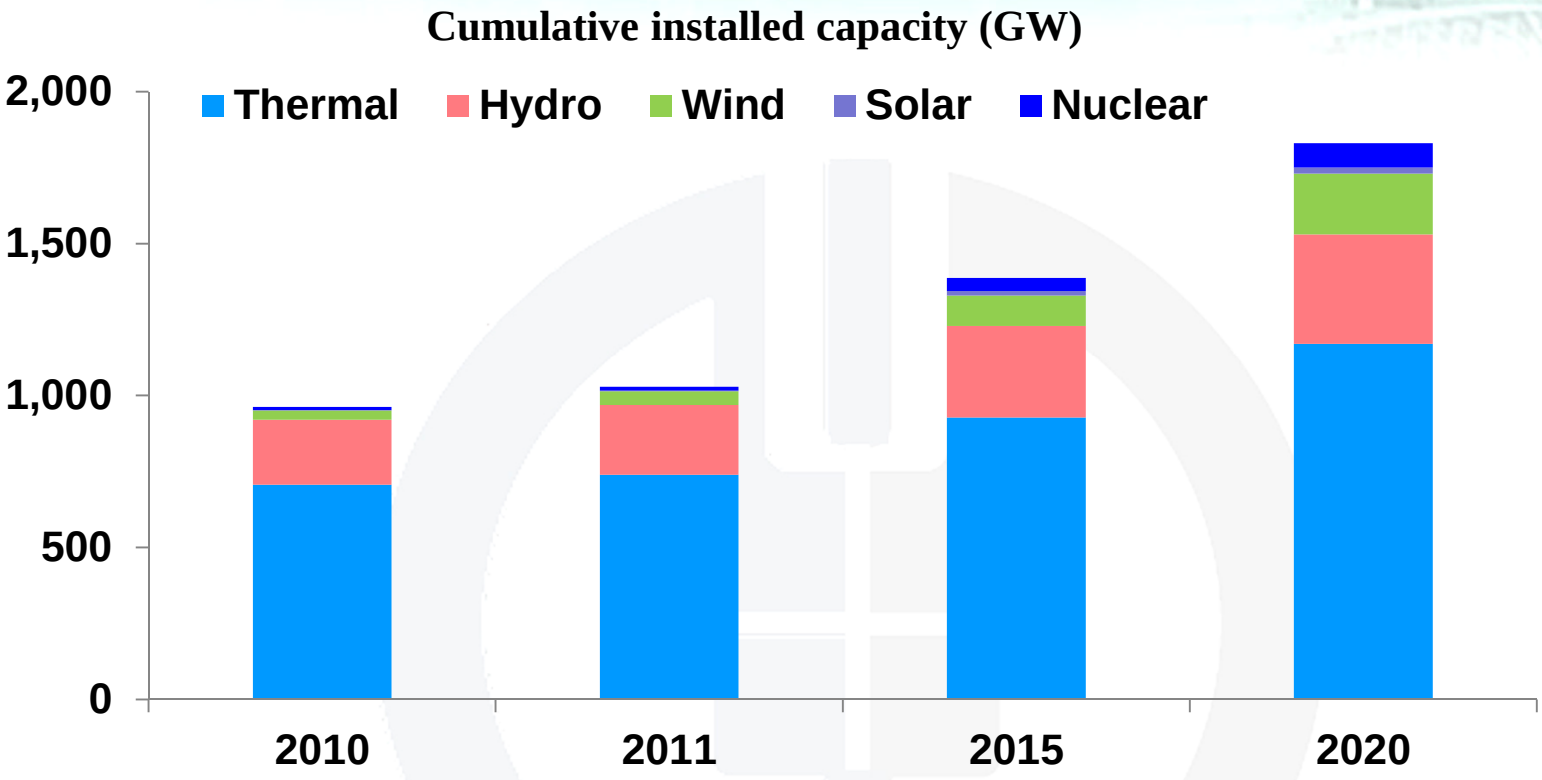
Source: China Electric Council, NBSC

- **Elasticity ratio = Real GDP growth/ Power output growth**
- **Ratio range from 0.57x to 1.55x during 2001-2011; Average = 1.19x**
- **12th Five Year Plan – Target average annual GDP growth = 7%**
- **We expect power generation to grow at 8.3% (1.19x * 7%) during 2012-2013**

Factors driving growth of renewable energy

- **Concern over security of energy supply**
  - **Traditional fossil fuel like coal is finite resources.**
- **Increasing worldwide environmental awareness and concern for environmental sustainability**
- **Renewable energy becomes relatively cheaper when compared to traditional energy sources (China coal price has risen from US$80/ton in beginning of 2009 to US$142/ton in Mar 2012)**
- **Due to the increasing demand for renewable energy, there will be a change in the structure of power generation in China**

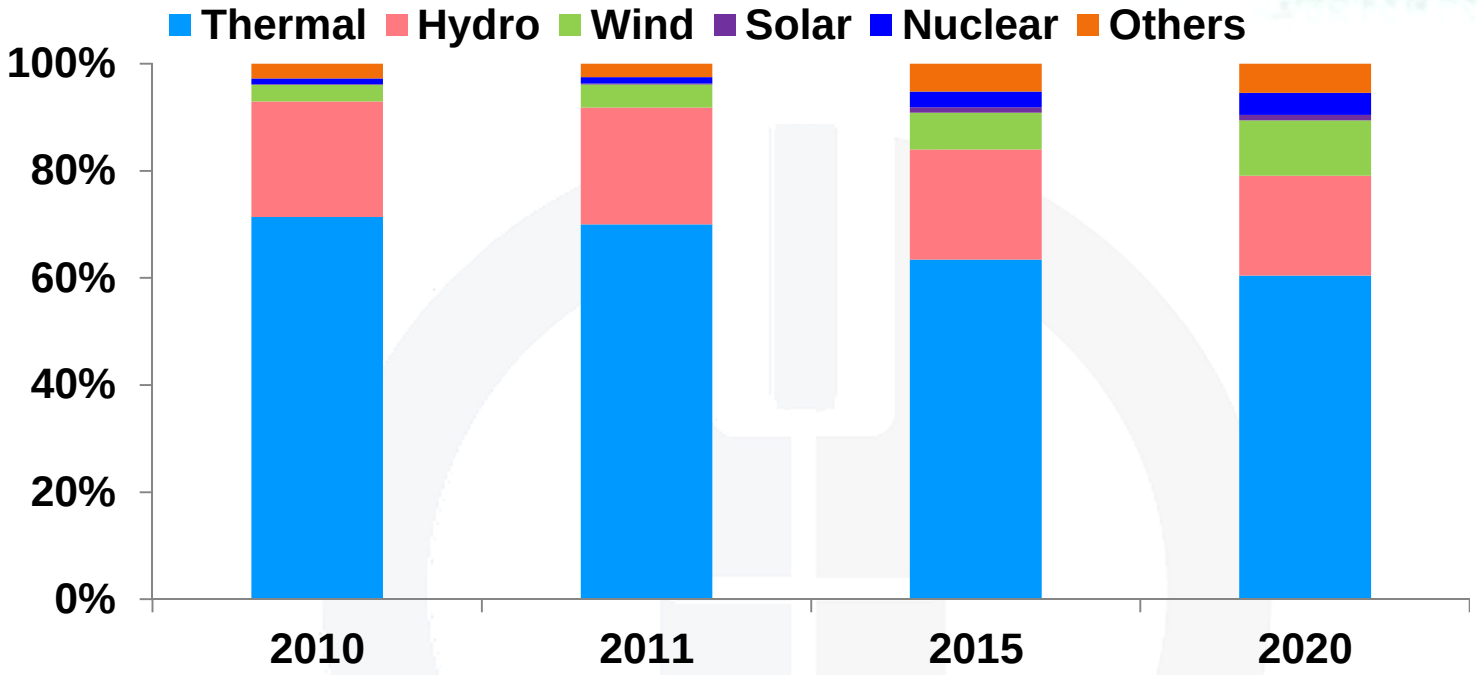
Change of electricity generation structure



Source: National Energy Administration

- **According to 12th Five year plan on renewable energy**
  - Solar – Installed capacity reach 15GW in 2015 and 20 GW in 2020
  - Wind - Installed capacity reach 100 GW in 2015 and 200GW in 2020

Change of electricity generation structure



Source: National Energy Administration

- % of installed capacity of thermal power will decrease from 70% in 2011 to 63% in 2015 and 60.5% in 2020.
- Among all the non-hydro renewable energy, wind will contribute the highest proportion of electricity generation.
- Wind installed capacity accounted for 4.3%/6.8%/ 10.3% of total installed capacity in 2011/2015/2020. Solar only accounted for 0.2%/1.0%/1.0% in 2011/2015/2020.

Favorable policies on wind sector

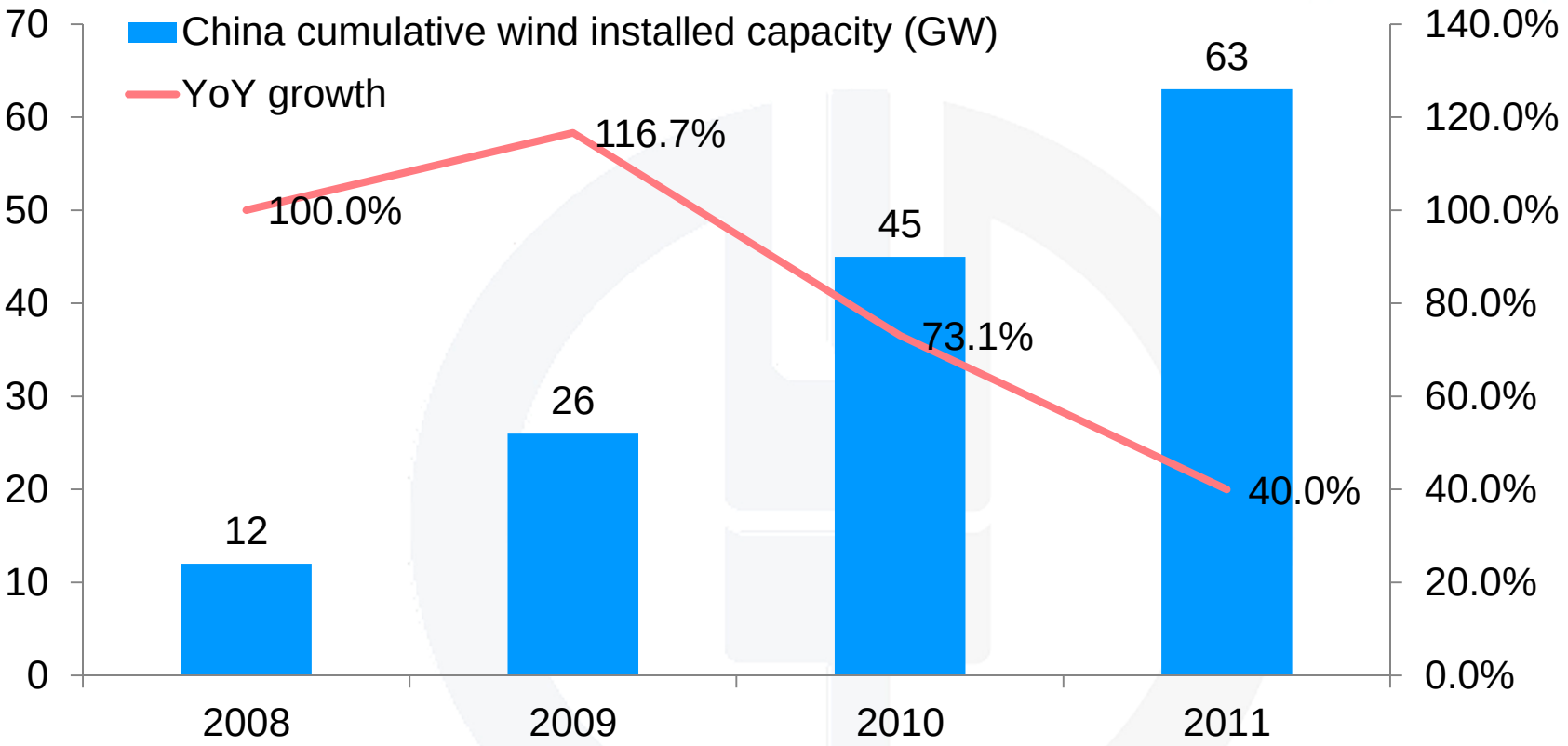
- **Mandatory Purchase and Dispatch Priority**

  The Renewable Energy Law provides that grid companies must purchase the full amount of on-grid electricity generated by approved renewable energy projects within their coverage. And that the Provisional Measures on the Dispatch of Energy Saving Power Generation provides that power producers are entitled to enjoy the highest dispatch priority if they use renewable energy including wind, solar and tidal power.

- **Taxation:**

  Approved wind projects are fully exempted from enterprise income tax for 3 years starting from the year when operating income is first derived from sales of electricity, followed by 50% exemption from enterprise income tax for another 3 years thereafter.

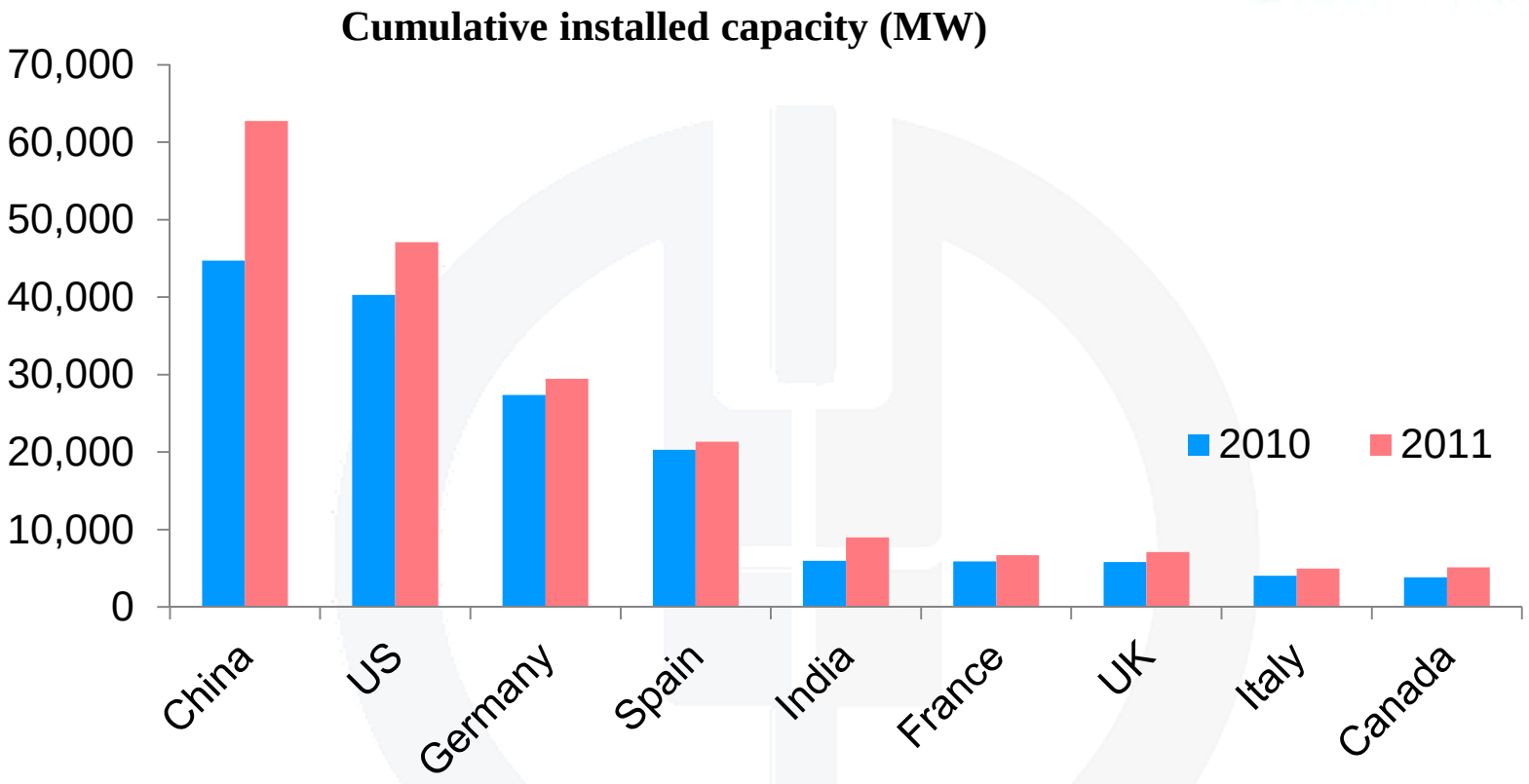
China wind market experienced rapid growth



Source: BTM World Market Update 2010 and GWEC

- **China's cumulative wind installed capacity experienced CAGR growth of 73.8% during 2008-2011.**
- **Annual growth rate is declining as base number gets larger.**

Global wind markets in 2011



Source: BTM World Market Update 2010 and GWEC

- **In terms of cumulative wind installed capacity, China has become the largest wind power country in the world since 2010 after several years of exponential growth.**

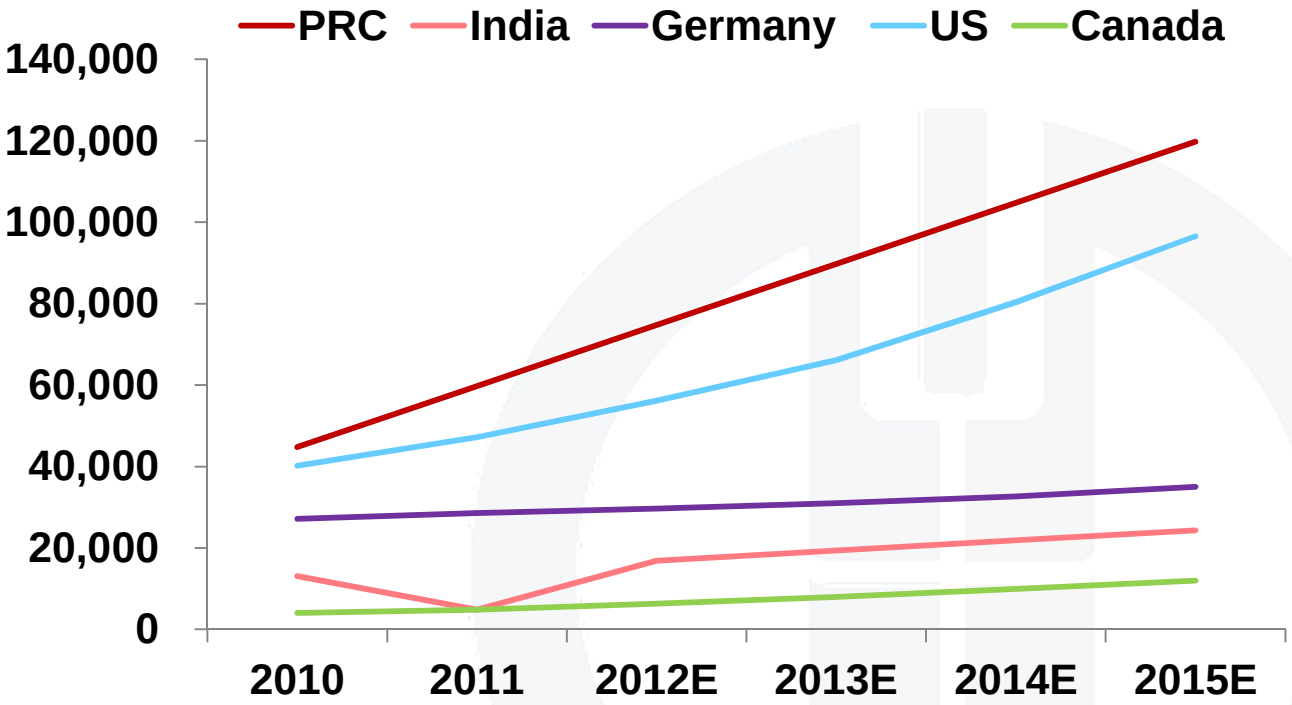
Global wind markets in 2011

Newly installed capacity (MW)

Country	MW	%
China	18,000	43.7%
US	6,810	16.5%
India	3,019	7.3%
Germany	2,086	5.1%
UK	1,293	3.1%
Canada	1,267	3.1%
Spain	1,050	2.5%
Italy	950	2.3%
France	830	2.0%
Sweden	763	1.9%
Top 10 subtotal	36,068	87.5%
Rest of the world	5,168	12.5%
2011 global installations	41,236	100.0%

Source: BTM World Market Update 2010 and GWEC

Global cumulative installed capacity of wind power (MW)



	10-15 CAGR
China	21.8%
US	19.2%
Germany	5.2%
India	13.3%
Canada	24.5%

Source: Garrad Hassan

- **China will continue to be the largest wind power country for the next 3 years till 2015.**

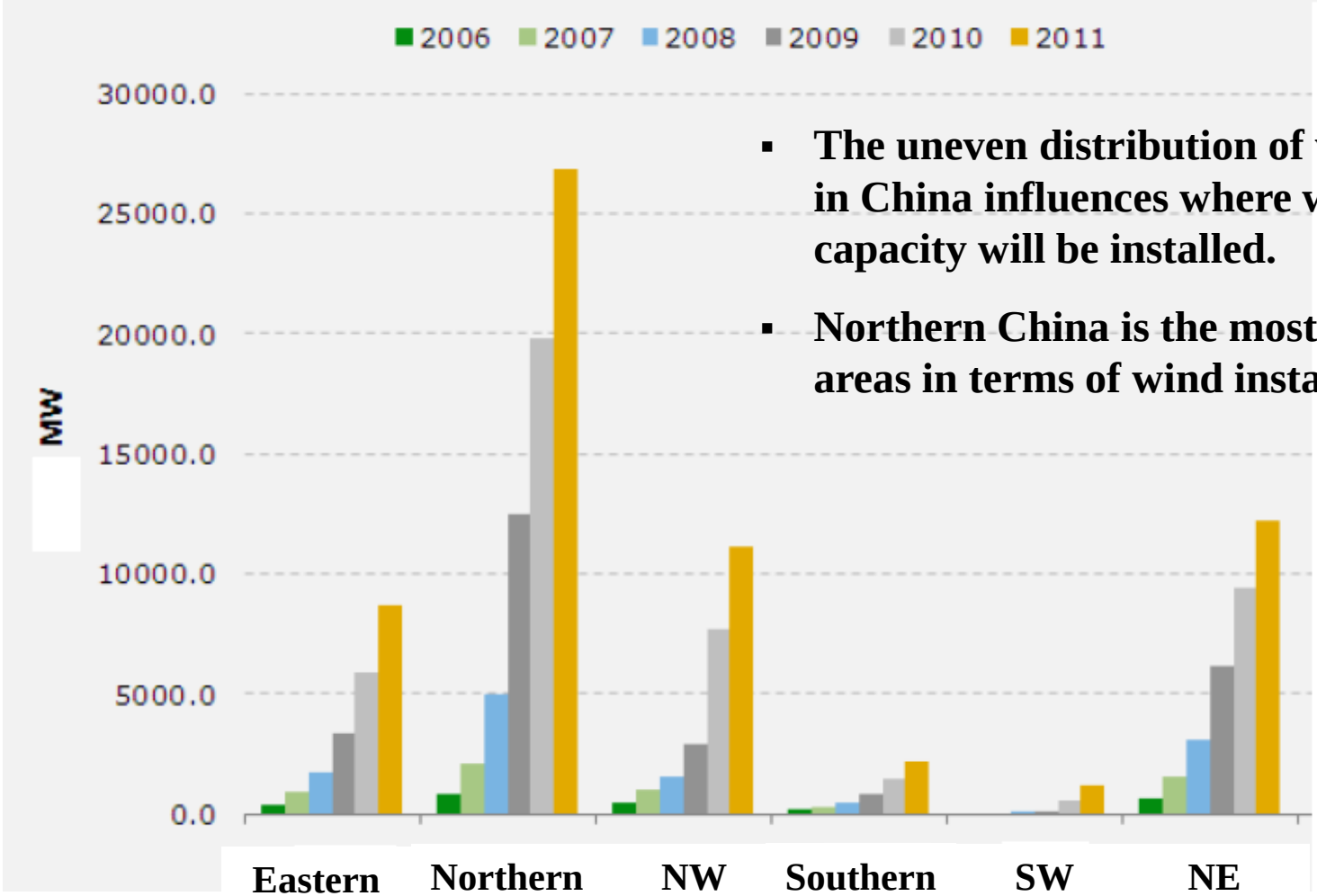
Wind resources in China

Province	Technically exploitable wind resources	Province
	GW	
Inner Mongolia	150	Inner Mongolia
Xinjiang	>100	Xinjiang
Gansu	>100	Gansu
Hebei	>40	Hebei
Jiangsu	>10	Jiangsu
Jilin	>10	Jilin

Source: Chinese Renewable Energy Industries Association

- **Northern part of China are regions with the most abundant wind resources.**
- **South-eastern coastal areas including Shandong, Jiangsu, Zhejiang, Fujian, Guangdong, Guangxi and Hainan also have high potential for wind power development.**

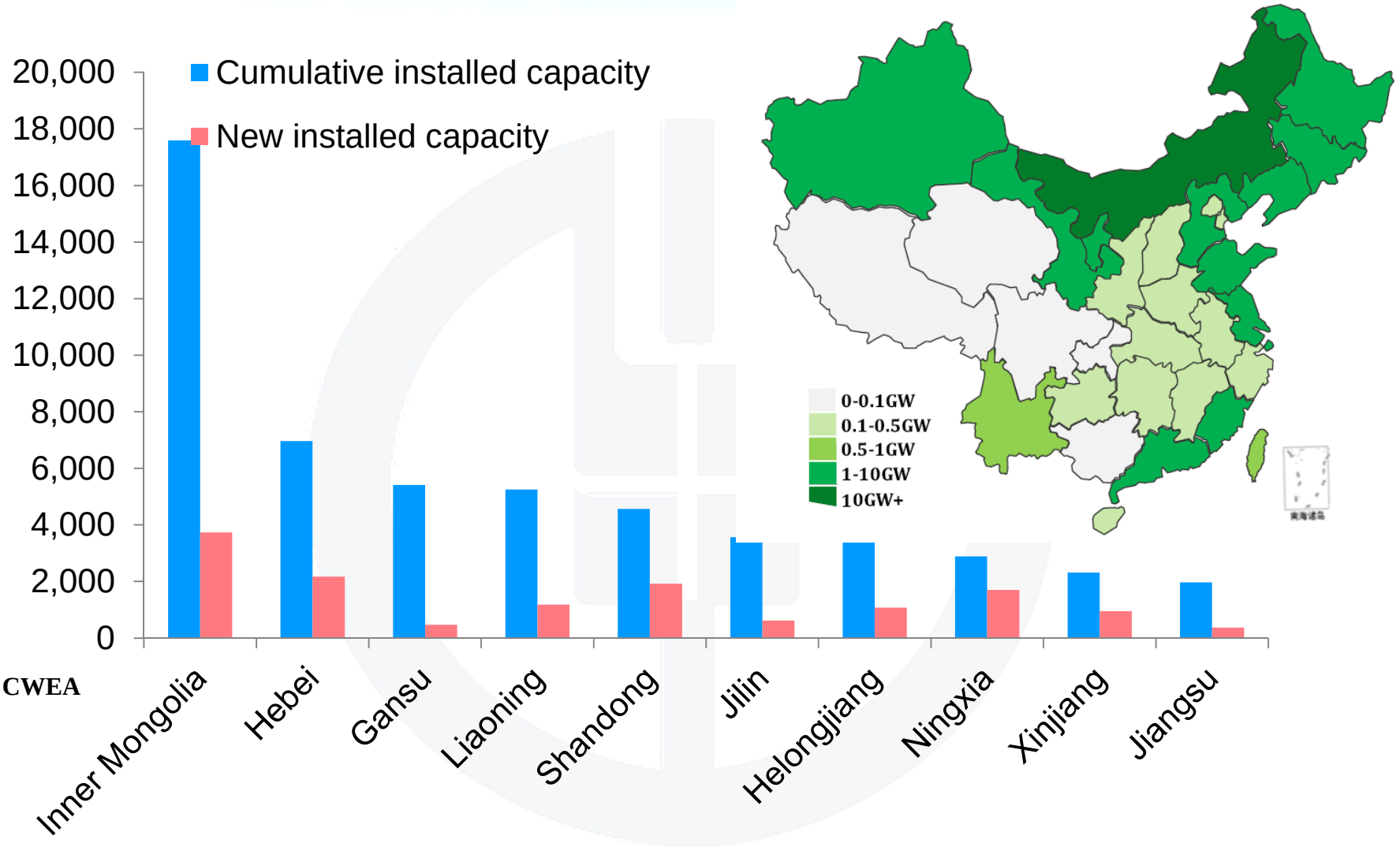
Wind farm locations in China



- **The uneven distribution of wind resources in China influences where wind power capacity will be installed.**
- **Northern China is the most developed areas in terms of wind installed capacity.**

Source: CWEA

Wind farm locations in China in 2011

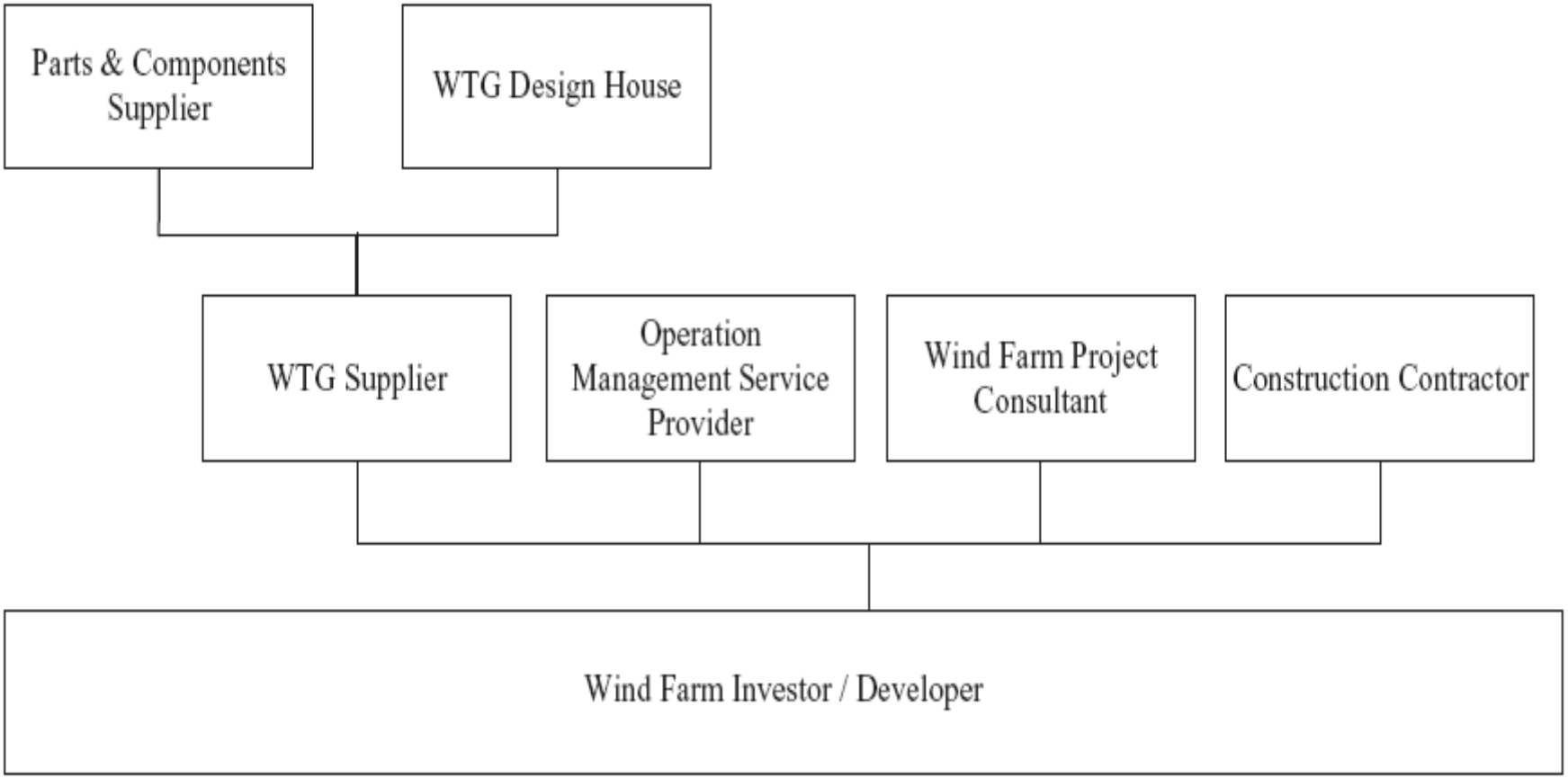


Source: CWEA

- **All electricity generated from the wind power plants will be sold to grid companies.**

WTG manufacturers and Wind farm operators

Value chain of wind industry



- **Upstream: WTG Supplier - manufacture blades, nave, gearbox, generator, cabin, supporting tower**
- **Downstream: Wind farm operators – Develop wind farm and maintain smooth operation of wind farm**

WTG Suppliers – Global competitive landscape (2010)

	Newly installed capacity (MW)	Market share
Vestas (Denmark)	5,842	14.8%
Sinovel (China)	4,386	11.1%
GE Wind (US)	3,796	9.6%
Goldwind China)	3,740	9.5%
Enercon (Germany)	2,846	7.2%
Suzlon (India)	2,736	6.9%
Dongfang Electric (China)	2,624	6.6%
Gamesa (Spain)	2,587	6.6%
Siemens (Denamrk)	2,325	5.9%
United Power (China)	1,643	4.2%
Others	6,948	17.6%
Total	39,473	100.0%

Source: BTM Consult Apt ; World market update 2010

WTG Suppliers – Competitive landscape in China (2011)

	Newly installed capacity (MW)	Market share
Goldwind	3,600	20.4%
Sinovel	2,939	16.7%
United Power	2,847	16.1%
Mingyang	1,178	6.7%
Dongfang Electric	946	5.4%
Subtotal	11,510	65.3%
Others	6,121	34.7%
Total	17,631	100.0%

Source: CWEA

- China wind farm operators mainly consumes wind turbines from domestic producers.

WTG Suppliers – Challenges

- **Oversupply**

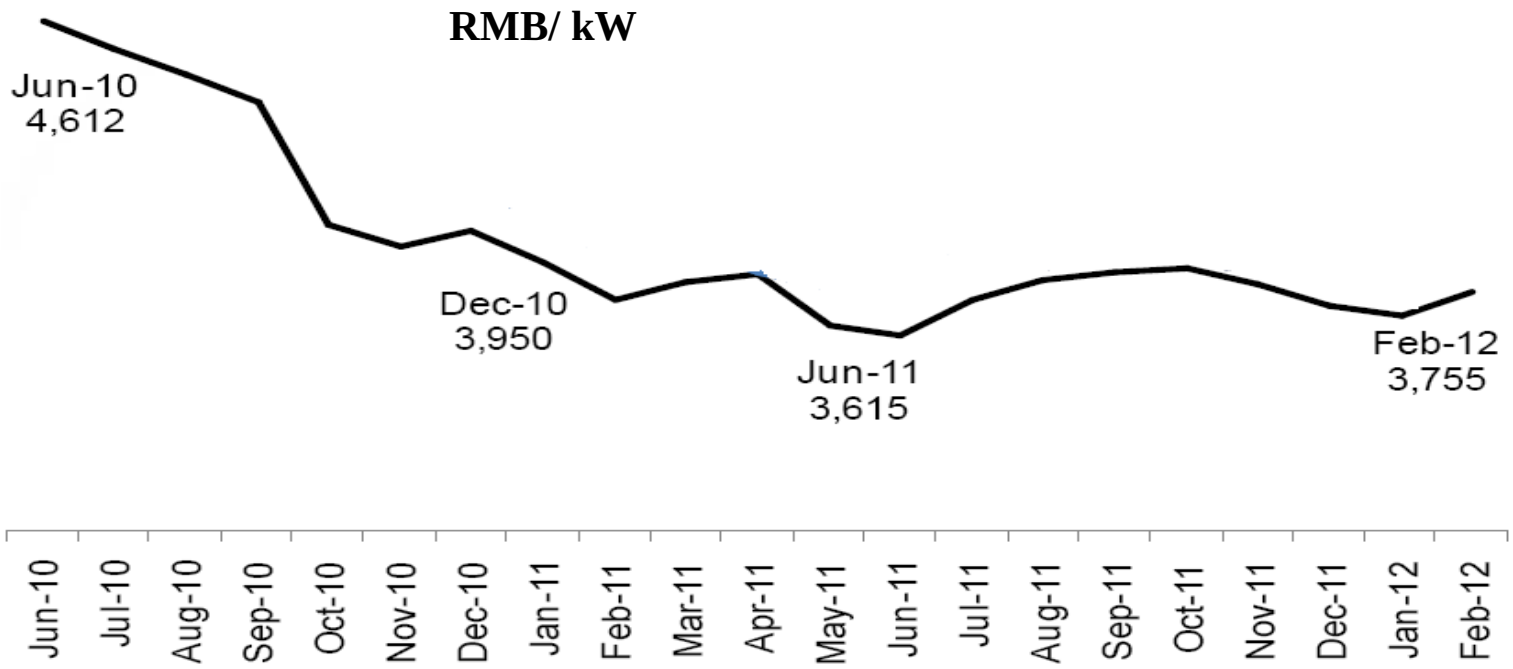
	Production Capacity in 2012(MW)
Sinovel	5,430
Goldwind	4,350
Dongfang Electric	3,750
United Power	4,200
Mingyang	3,447
Total	21,177

Source: Company reports

- **Domestic WTG demand is expected to be 14GW per year in next five years.**
- **But Top 5 WTG manufacturers have production capacity of 21GW in 2012.**
- **→ 7GW of supply surplus → continue drop in ASP**

WTG Suppliers – Challenges

- **Declining price trend of wind turbines**



Source: Goldwind

- **WTG ASP dropped 21.6% from Jun 2010 to Jun 2011. ASP rebounded slightly since Jul 2011, but upside is limited by the supply surplus.**
- **Due to the over capacity problem in China, the domestic manufacturers have to develop overseas market.**
- **On the other hand, downstream wind farm operators benefit from the decline in ASP price.**

Wind farm operators – Global competitive landscape

- **Top 10 wind farm operators in the world**

	Total wind installed capacity (MW)		
Countries	**2008**	**2009**	**2010**
Iberdrola (Spain)	8,960	10,350	12,136
NextEra (US)	6,374	7,544	8,298
Longyuan (China)	2,924	4,842	6,969
EDP Renovavels (Portugal)	5,052	5,576	6,676
Acciona (Spain)	4,566	6,230	6,270
Datang Renewable (China)	1,768	2,619	4,020
E.ON (Germany)	1,890	2,873	3,567
Huaneng Renewables (China)	402	1,550	3,522
ENEL (Italy)	1,237	1,510	2,654
China Huadian (China)	456	1,348	2,557
Subtotal	33,629	44,442	56,669
Total	**120,206**	**153,813**	**190,369**
Top 10 mkt share	**28.0%**	**28.9%**	**29.8%**

Source: BTM Consult Apt ; World market update 2010

Wind farm operators – Competitive landscape in China

- **Top 10 wind farm operators in China in 2010**

	Total wind installed capacity (MW)	Market Share
Longyuan Power	6,969	15.6%
Datang Renwable	4,020	9.0%
Huaneng Renewables	3,522	7.9%
China Huadian	2,557	5.7%
CGN	2,300	5.1%
Shenhua Guohua Energy	2,346	5.2%
China Power Investment	1,708	3.8%
Beijing Energy Investment	1,170	2.6%
China Resources Power	977	2.2%
Total	44,733	100.0%

Source: Company reports, Garrad Hassan, CEC

Favorable on-grid tariff

- **China is divided into four wind resource zones, and all onshore wind power projects in the same zone apply the same benchmark on-grid tariff :**

Wind resource area	On-grid tariff (Rmb/kwh)	Major Regions
Class I	0.51	• Inner Mongolia (Zone1) • Xinjiang(Zone1)
Class II	0.54	• Hebei (Zone2) • Inner Mongolia (Zone2) • Gansu (Zone 2)
Class III	0.58	• Jilin (Zone 3) • Heilongjiang (Zone3) • Gansu (Zone 3) • Ningxia
Class IV	0.61	All other regions not included in Class I, II and III.

- **Inverse relationship of wind resources and on-grid tariff**
- **Favorable on-grid tariff compared to average of Rmb0.43/kwh of coal-fired power plants.**

Outlook and Comparison

Why a sudden interest on the renewable energy sector

Policy driven

- **Medium and Long term Development Plan for Renewable Energy**
  - Target to raise share of renewable energy in total primary energy consumption to 11.4% by 2015 and 15% by 2020. (2011: 11.4%)
- **12th Five year plan on renewable energy**
  - Solar – Installed capacity reach 15GW in 2015 and 20 GW in 2020
  - Wind - Installed capacity reach 100 GW in 2015 and 200MW in 2020
- **Beijing starts to release figures on PM2.5 in Jan 2012**
  - PM2.5 is particulate matter with 2.5 microns in diameter and less.
  - Stricter control on air pollutants is one way in encouraging renewable energy sector

Recent concerns on the wind industry in China

- **Wind farm quality**
  - 3 big wind farm faults in Gansu and Hebei in 2011
- **High wind curtailment rate**
  - Since development of grid infrastructure cannot catch up with development of wind farms, part of the wind capacity in China is not connected to grid, leading to wind curtailment problem. And problem mostly occur in Inner Mongolia and Gansu. Wind curtailment rate in Inner Mongolia, Jilin, and Gansu reaches 23%, 20% and 17% respectively.
- **Tighter monetary policy**
  - Reduced availability of project financing, higher finance costs.

Outlook on China wind industry

- **Higher requirements on quality**
  - 18 new standards are announced in Aug 2011 ---> benefit large wind farm operators.
- **Stricter control on wind farm approvals → Slowing growth**
  - 26.8GW wind farms approved in 2011 and expect only 16-18 GW new approvals in 2012.
- **Aim at reducing wind curtailment rate by:**
  1. **Building small and diversified wind farms:** Rather than building large wind farms in Northern part of China, build small and diversified wind farms in areas with high electricity consumption and more developed grid connection.
  2. **"Quota system" to be announced before Jun 2012.**

Industry characteristics

- **Capital Intensive Industry**
- **Low ROAA and ROAE**
- **High gearing ratio**

Comparison

- **List of tables**

		Net D/E(%)	ROAA(%)	ROAE(%)
916	Longyuan	146.08	3.20	10.82
1798	Datang Renewable	264.07	1.53	8.37
958	Huaneng Renewables	174.06	2.41	12.31
		Simple Av.	**1.38**	**10.50**
2208	Goldwind	19.88	1.99	4.64
658	China High Speed	78.89	3.34	7.49
		Simple Av	**5.33**	**6.06**
902	Huaneng Power	265.81	0.49	2.26
991	Datang Power	316.71	0.86	5.65
836	China Resources Power	127.47	2.86	9.93
1071	Huadian Power	432.67	0.05	0.45
2380	China Power Int	249.07	0.84	3.98
		Simple Av	**1.01**	**4.45**

Source: Bloomberg; ABCI Securities

Comparison

- Wind farm operators are better choice when compared to WTG suppliers
- WTG suppliers
  - Oversupply and face international competition
  - Quality not high enough to explore international market
  - Declining price
- Wind farm operators
  - Do not need to compete with international peers
  - Benefit from declining WTG price
  - Wind curtailment problem will hopefully be solved

Key indicators for wind farm operators

2011	Utilization hours	On-grid tariffs	Consolidated installed capacity	Newly installed capacity	Gross power generation	New gross power generation
	Hrs	Rmb/kwh	MW	MW	GWh	GWh
Longyuan (916)	2,026	0.578	8,598	2,042	13,355	3,261
Datang Renewable (1798)	1,951	0.591	5,259	1,231	7,233	2,400
Huaneng Renewables (958)	1,962	0.596	4,904	1,382	6,844	3,056

Source: Company reports

- **Utilization hours (affected by wind farm locations)**
- **On-grid tariffs (affected by wind farm locations and government policies)**
- **Installed capacity (affected by financial strength)**
- **Liquidity or financial capability**
- **Pick market leaders with highest profitability but be careful of share liquidity problem**

Conclusion

- **Policy driven: Our interest in the renewable energy sector is driven by the favorable policies including the 12th Five Year Plan and the recent policy on PM2.5**
- **Focus on wind: We pick wind as our focus as it will be the major source of non-hydro renewable energy in China.**
- **Who to pick in wind sector: As the upstream WTG suppliers suffer from decline in ASP while the downstream wind farm operators benefit from the declining trend, we believe wind farm operators are the one to pick.**
- **Risk: However, wind farm operators have low ROAA and high net debt to equity ratio, which are the industry characteristics of the power plants providers.**

Thank You!

Disclosures

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