

equinox

“the beginning of sustainability”

China: Stimulus Package Carbon Markets

and

“the future of wind in China”



“The age of uncertainty”

April 8, 2009

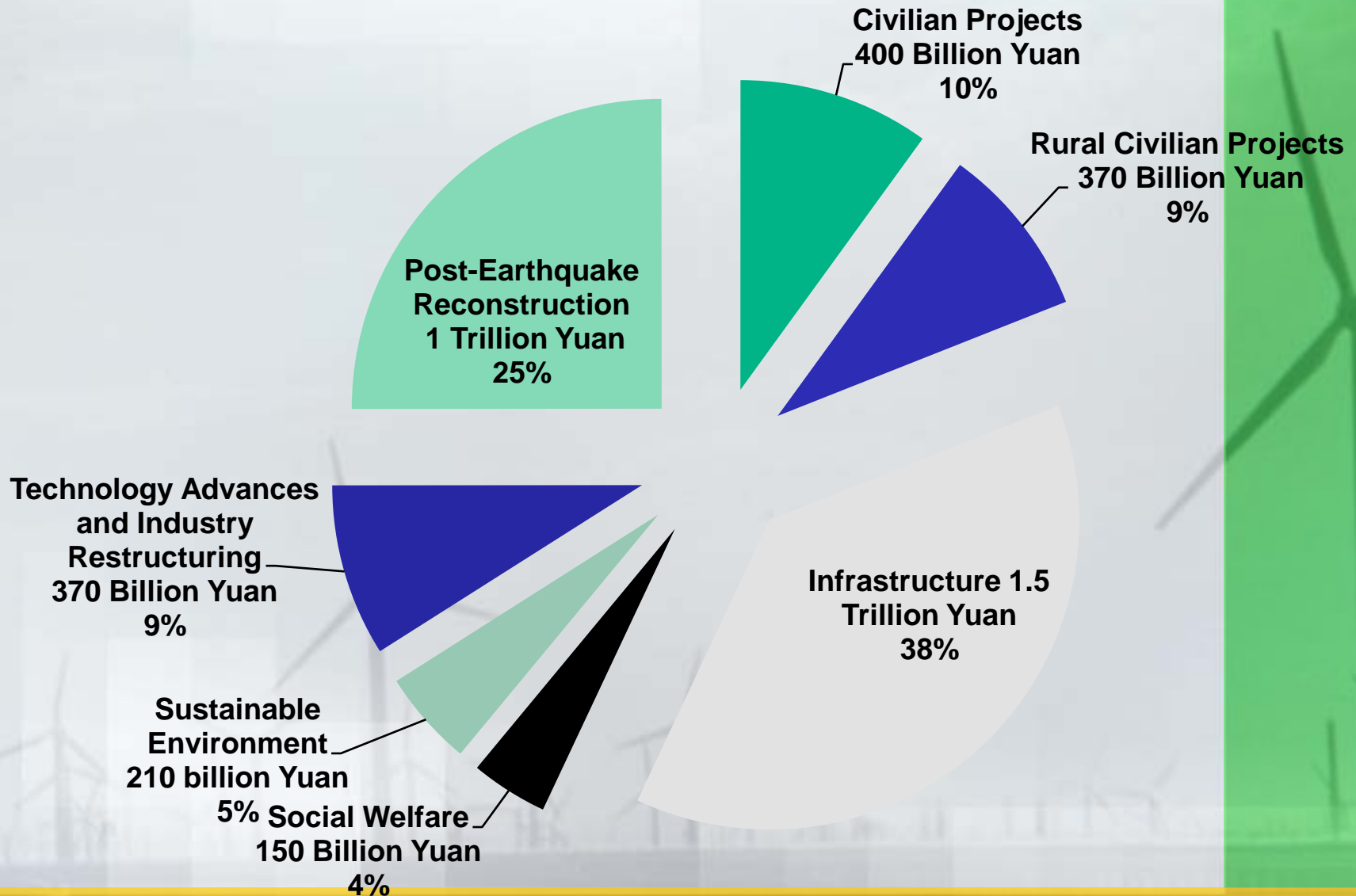
Gerald Page

Managing Director

Equinox Energy Partners Corporation

Beijing, China

China's Stimulus Package



Look at 2008 Q4 and 2009 Q1

- **Ministry of Water Resources**
 - South-to North Water Diversion Project: 2 Billion Yuan
 - Water Conservancy Projects: 7 Billion Yuan
 - Safe Drinking Water Projects (covering 15 million rural residents): 5 Billion Yuan
 - Irrigation Projects (in main grain production areas) : 3 Billion Yuan
 - Repair of 320 large-and medium-sized dams: 3 Billion Yuan
- **Ministry of Environmental Protection**
 - Renewable energy developments (Nuclear, wind and solar as top priorities)
 - Water and energy saving technologies
- **National Energy Administration**
 - Eastern Sector of the West-to-East Gas Pipeline II: 93 Billion Yuan
 - Extension of nuclear projects in Guangdong Province: 95.5 Billion Yuan
 - 10 New Nuclear Power Stations in Fujian and Guangdong Province
 - PetroChina Oil Refinery in Sichuan
 - Reinforcement of urban and rural area grids and construction of ultra high voltage DC transmission line between Sichuan and Jiangsu

Stimulus Package- A “Green” Comparison

China

Green Stimulus
\$221.3 Billion
38%

Total Stimulus
Package
\$586.1 Billion

United States

Green Stimulus
\$112.3 Billion
12%

Total Stimulus Package
\$972 Billion

Carbon Market in China- Key Points

- **Decrease in Project Development**

- China to maintain floor price of €8/ton CO₂e despite the fact that the financial crisis and lowered demand for carbon credits has driven carbon prices to fall below of €8/ton CO₂e

- **Delay in Project Development**

- While the floor price remains at of €8/ton CO₂e , many projects are experiencing decreased profitability
- Projects that have been contracted at a price lower than €8/ton CO₂e must revise and resubmit to the NDRC, experiencing a delay of 2-3 months

- **Decrease in Projects Submitted for Registration at the EB**

- China submitted ½ the number of projects in February that it did in January

Essentially, a switch from being a Seller's Market to a Buyer's Market.

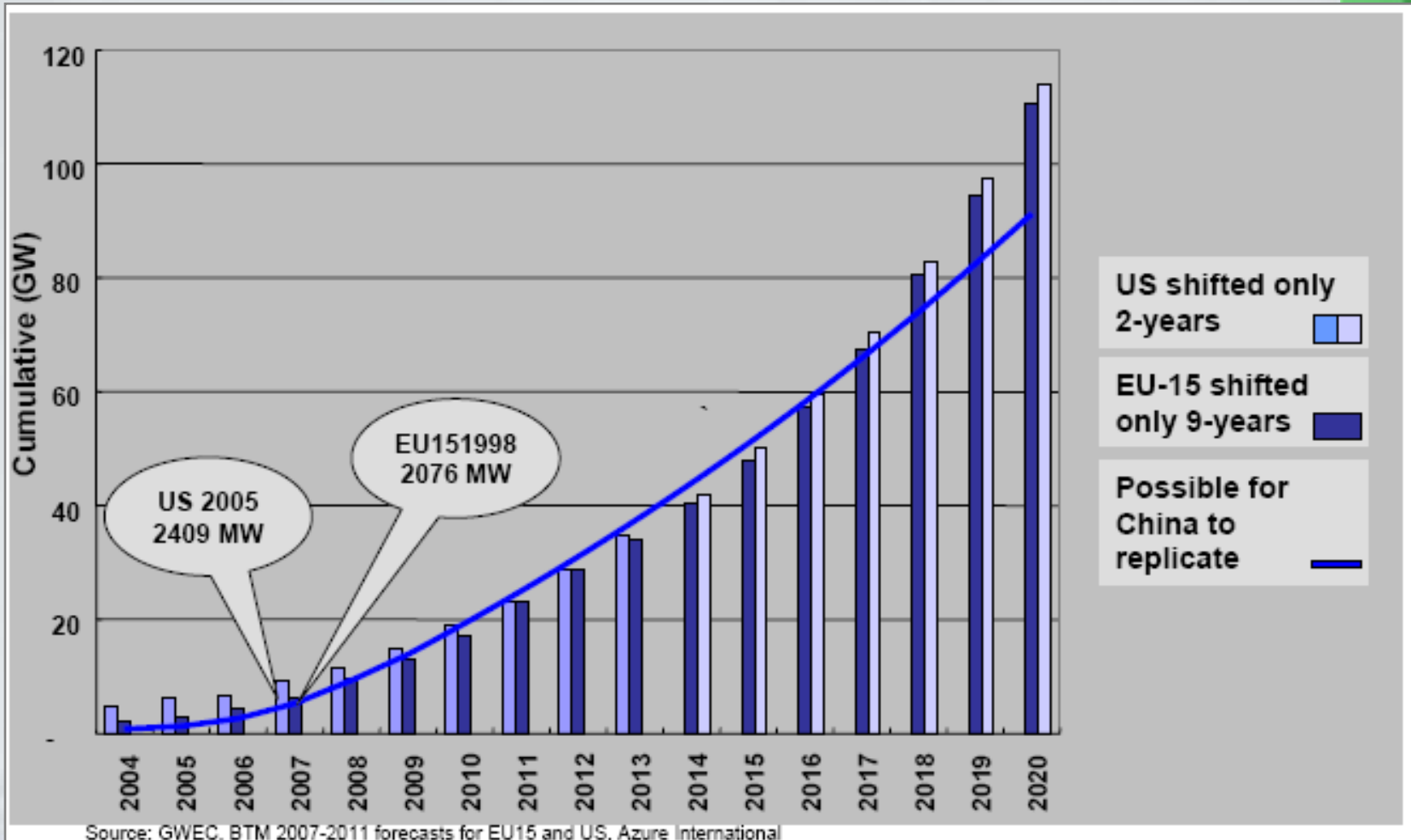
The China Wind Market

The China Wind Market

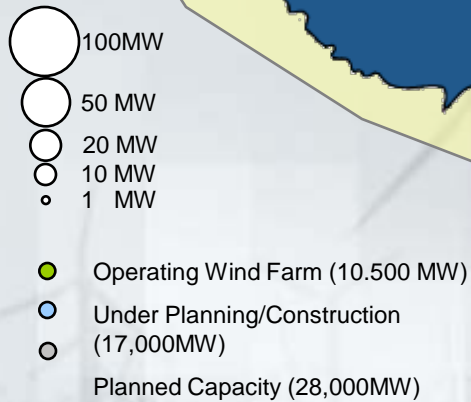
- China's installed power capacity: 2005 – 2020
- China still requires 80-100GW of power per year to sustain current forecasted economic growth, and that of this amount approximately 70- 80% is coal “**1GW every 5 days**”
- Current thinking 12-15MW of wind will be developed by 2010 period, with forecasting of over **100GW** before 2020.
- we can easily calculate that this will represent over **\$140 billion** of new capital. So where will this come from and who will participate?
- When considering domestic wind development against foreign we must also consider that 3 years ago there were just a handful of domestic turbine manufacturers in China, and within the last 3 years over **40 new turbine manufactures** have entered the market, creating concerns about supply chain component reliability, and warranties of domestic turbines.

100GW Installed in China by 2020 is Possible!

The chart below demonstrates that even if China only follows the growth patterns seen in the US and EU15, China could achieve 100GW of installed wind capacity by 2020.



Background: Wind Development



Source: Azure International

Demand – the domestic market

- Development activity update (1H 2008)

7.9 GW installed (as at end June 2008)

1H08 installed 2GW vs. 1H07 960MW ↑113%

~ 232 “projects” operating

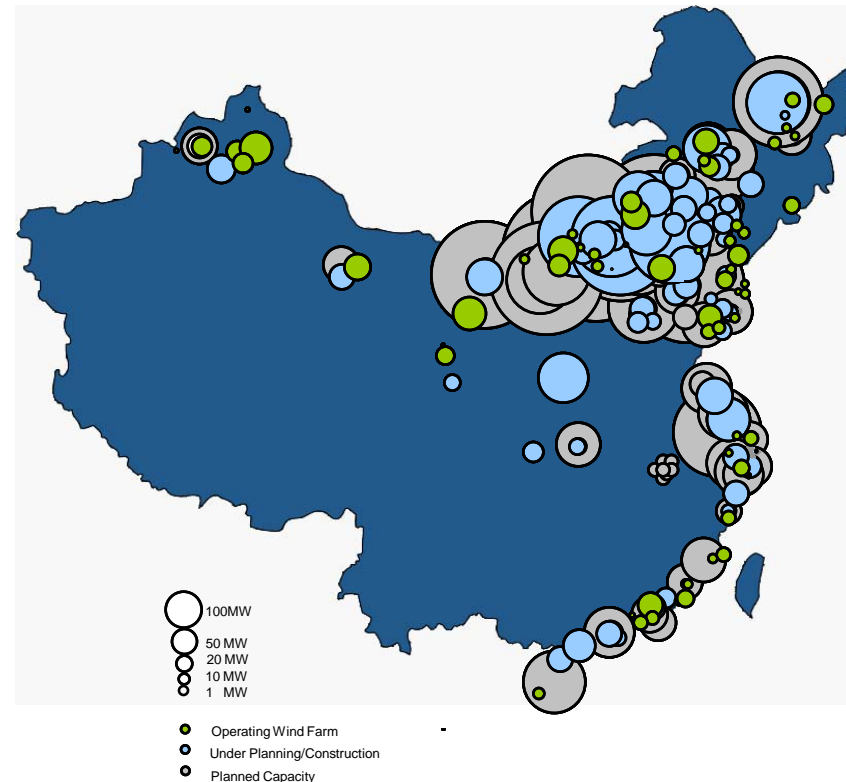
~ 255 sites with 19 GW of orders outstanding

~ 513 sites represent 35 GW of “imminent dev”

~319 active project dev Cos.

~ 30 parent Cos. represent 90% project installations and turbine orders as of 2007

Accelerating development activity



Source: Azure International
Note: Activity summary as at 1H 2006

Demand – Companies with pipeline

- Led by the SOE gencos

- Sector participation led by energy related SOEs motivated by RPS
- Competition, not just by companies but by types of companies will be good for the long-term development of the sector
- International (5%) and private domestic (7%) of existing equity weighted interests, but as much as 20% each of long-term potential pipeline

Leading wind players according to development activity

Leading developers: Ranking by development activity

Equity weighted cap		Equity weighted cap		Equity weighted cap		Equity weighted cap & orders		Equity weighted near-term development (2008–2012)		
Co.	YE2006 (MW)	Co.	YE2007 (MW)	Co.	1H2008 (MW)	Co.	(MW)	Co.	(MW)	
1	Longyuan	700	Longyuan	1,375	Longyuan	1,645	Longyuan	3,306	Longyuan	5,036
2	State Grid	366	Datang	578	Datang	1,096	Huaneng	2,658	Datang	3,498
3	Datang	316	State Grid	541	State Grid	632	Datang	2,655	Huaneng	3,366
4	Ningxia Power	157	Shenhua	487	Shenhua	623	Huadian	1,938	Huadian	2,488
5	CECIC	129	Huaneng	380	Huaneng	464	Shenhua	1,639	Shenhua	2,127
6	Shenhua	124	Ningxia Power	289	Ningxia Power	331	Guangdong Nuclear	1,363	CPI	1,933
7	Huaneng	104	Huadian	239	CECIC	296	CPI	1,210	Guangdong Nuclear	1,883
8	Guangdong Yudean	100	CECIC	173	Huadian	231	State Grid	1,196	Shandong Luneng	1,479
9	HLJ Huafu	71	Beijing Energy Investment	153	CPI	194	Beijing Energy Investment	1,060	State Grid	1,429
10	HK Construction	58	Shandong Luneng	135	Beijing Energy Investment	188	CECIC	794	Beijing Energy Investment	1,210
		2,125		4,348		5,701		17,819		24,449
		80%		73%		72%		66%		70%

According to known data as at 18 Oct 2008

Source: Azure International

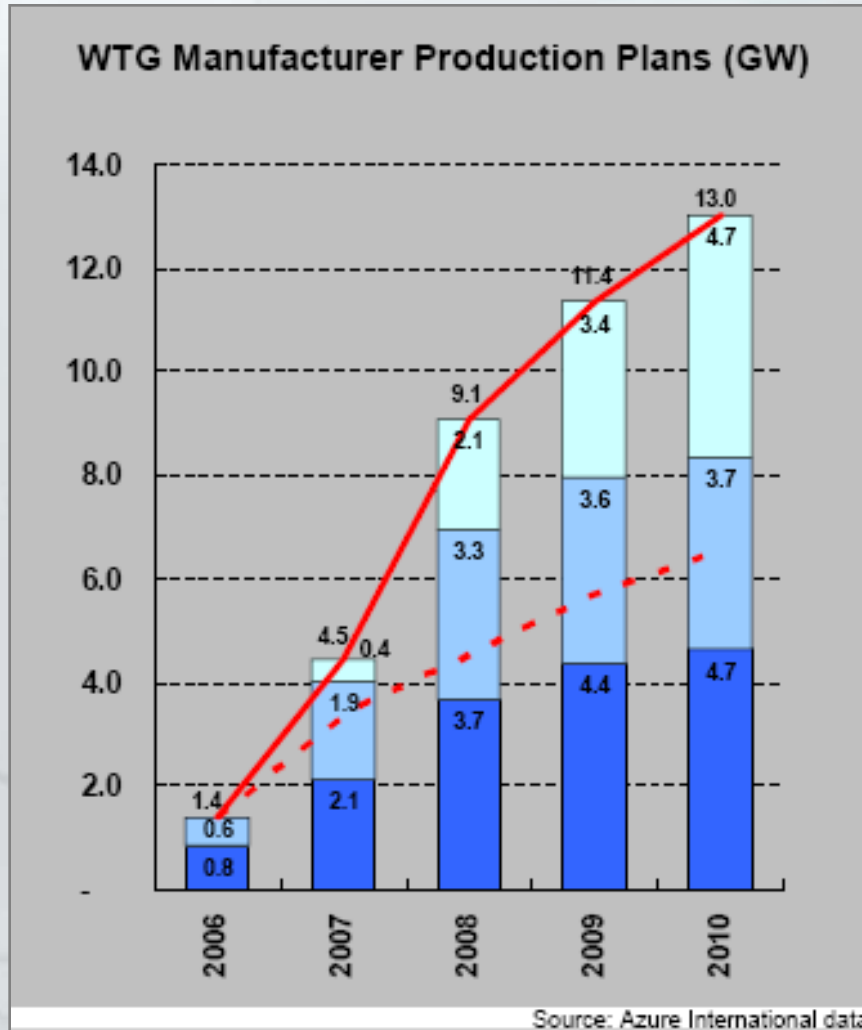
Note: Big 5 +1 domestic power producers highlighted in yellow

Localized turbine supply can match demand

- 40+ wind turbine manufacturing companies established in China.
- The major international suppliers are producing in China
- China is likely to become a supply base for wind turbines
- Consolidation expected in next 3 – 5 years

WTG Manufacturer Company Groupings

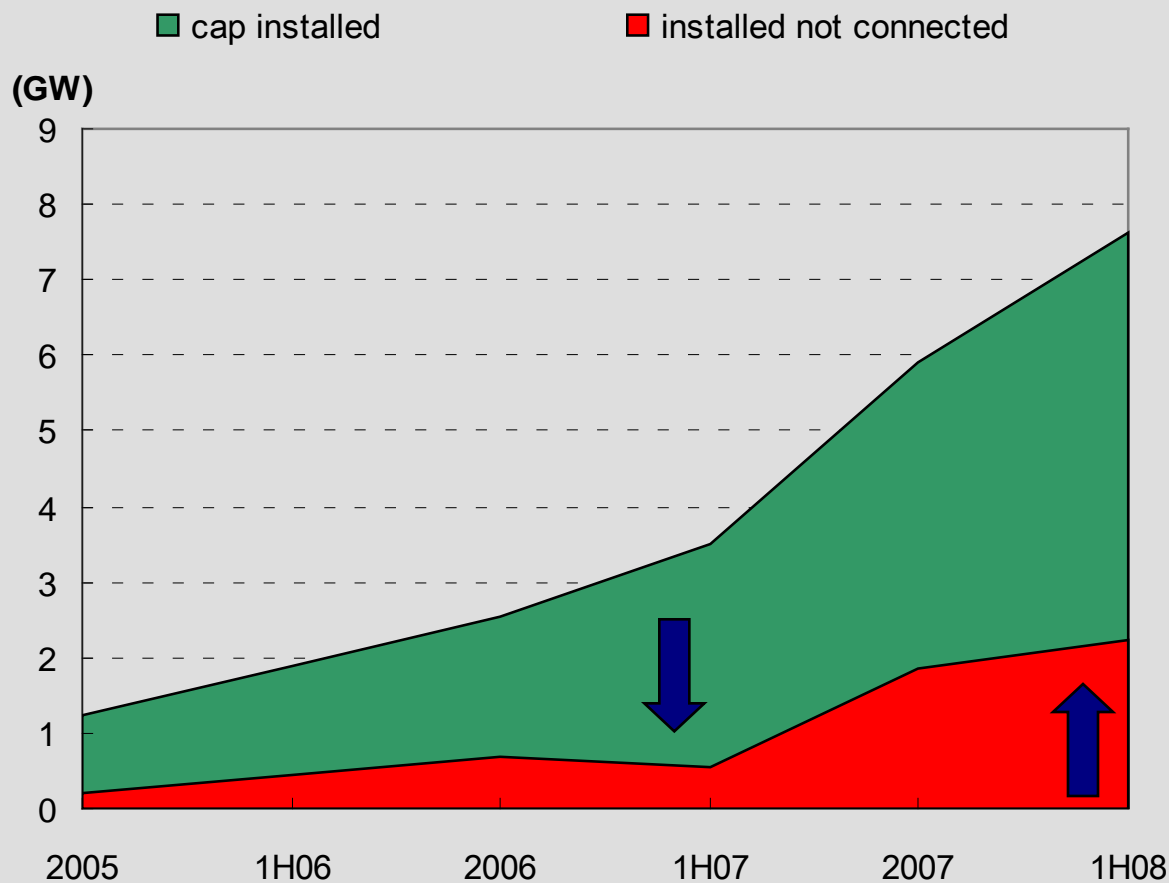
- Established International
Gamesa, GE, NCWA, Nordex, Suzlon, Vestas
- Established Domestic
Sinovel, Dongfang, Goldwind, Windey
- New entrants
24+ companies with tech or license agreements and detailed business plans for WTG manufacturing
- Aggregate pdn plans - - - Tempered pdn



Installed vs Connected

- CDM data confirms delays

Cumulative wind capacity installed & connected



Source: Azure International

Average interconnection delay 3-4 months

= 25% to 30% of a year

@ beginning 2008 2GW installed not connected

@ end 1H08 2.2GW installed not connected

Interconnection rate relative installation pace suggests 3GW by year-end

= Project IRR ↓ 1/2% worse than expected

Some Wind Sector Conclusions:

Most likely scenario:

18-20 GW by 2010,
120-150 GW by 2020

Implications:

- CAGR capacity growth of 24% over period of 2008 - 2020
- New capacity installations reaching 8+GW p.a 2013 onwards
- By 2020 wind generated power should account for 6-7% of installed capacity
- Cumulative investment scale of up to 150 billion Euros by 2020

Where to invest

- Many opportunities for investment in following areas 2009-2012 for 10 years of growth in renewable sector
- Supply chain component manufactures.
- Blade manufacturing, (20-30K blades needed to meet demands over next 2 years.
- Energy efficiencies, lubricants, composites.
- O& M Service infrastructure.
- Electric Vehicles.
- Waste water treatment.
- Solar PV and systems manufacturing.

Equinox Energy Partners

Investors and advisors in Renewable Energy

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Equinox Energy Partners Corporation

Gerald R. Page
Managing Director

Beijing, China

gpage@equinoxenergyco.com

Office +86-10-6551-5487
Cell +86-10-13552681517

A special thanks to Mina Guli and Peony Capital for the carbon section.

Carbon related information compiled and prepared by Chelsea Peoples.
cp@peonycapital.com