



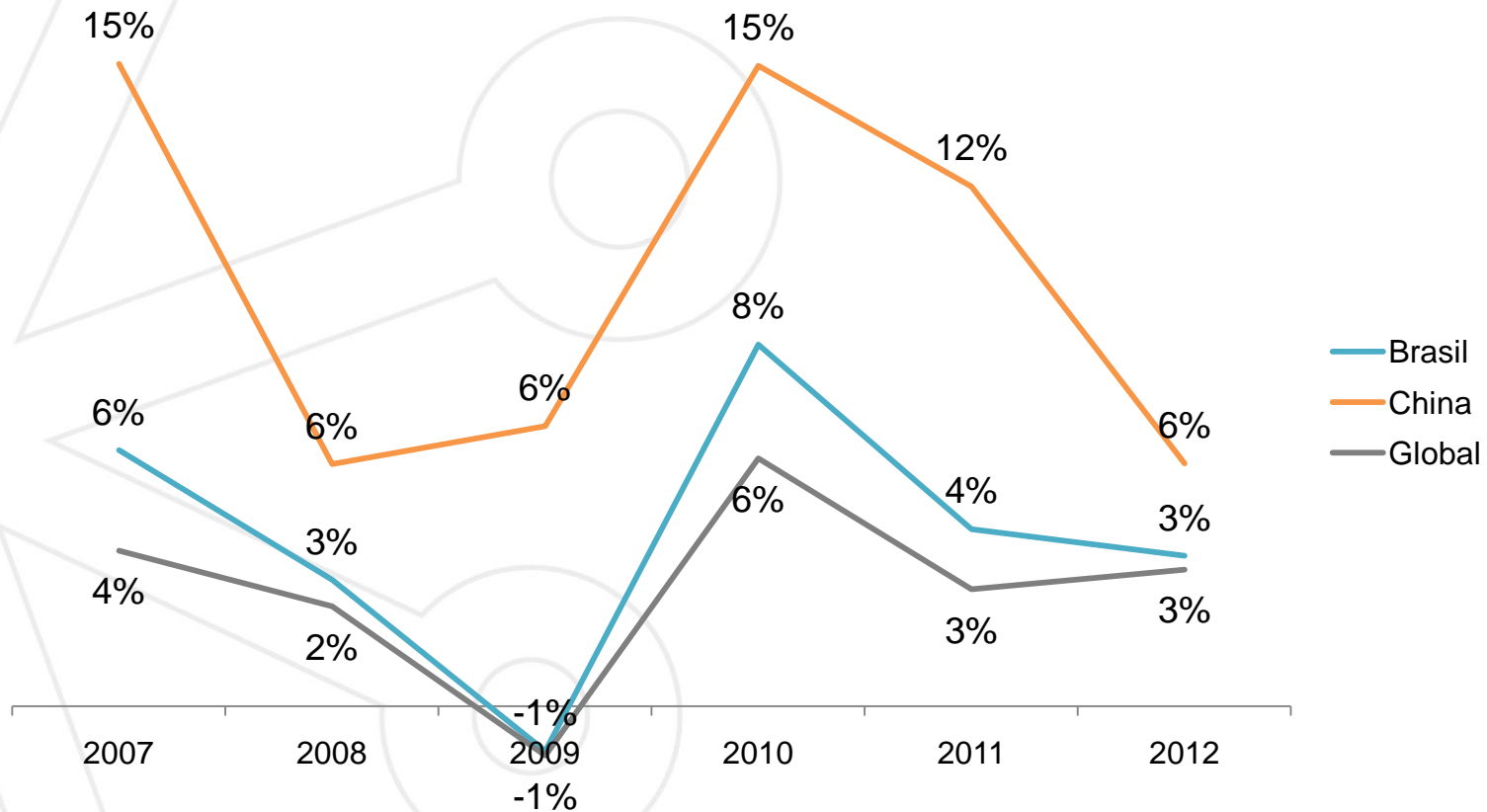
Brazil-China Dialogue: Renewable Energy

15º Encontro de Energia, 19-22 May 2014

Brazil and China: Growing Power Demand



- Growing faster than the world average

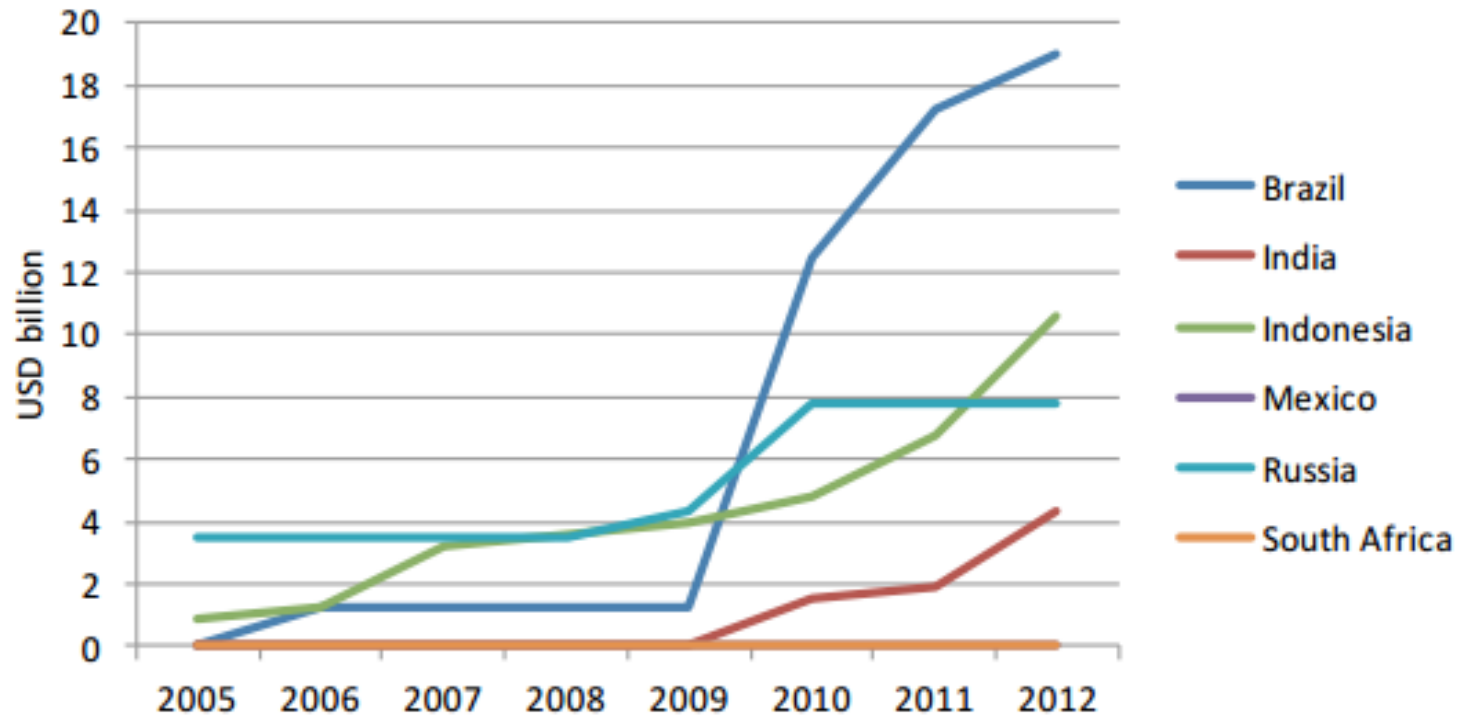


Source: Brazil Ministry of Mines and Energy; China Electricity Council; IEA

Chinese Investments in Energy in Brazil



Figure 3 • Cumulative Chinese energy investments in other key IEA partner countries, 2005-12



Source: Heritage Foundation, 2013.

Chinese Investment in Brazilian Energy & Transmission

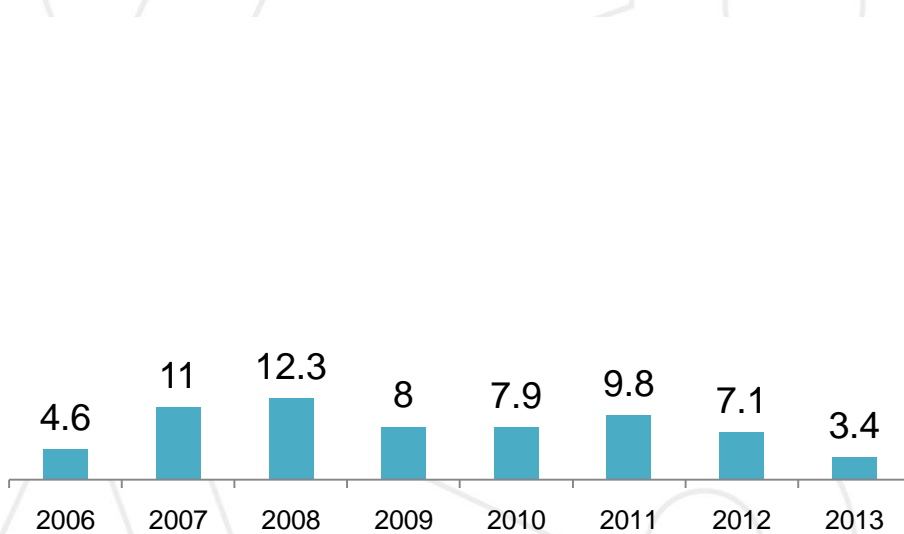


- **Hydroelectricity**
 - Both countries have mature hydro industries and reserves
 - Three Gorges' acquisition of EDP; São Manoel hydro
- **Oil and Gas**
 - Brazil's large pre-salt reserves (Bacia de Libra); Repsol; GALP
- **Transmission**
 - Similar distribution of resources and load centres; China ultra-high voltage transmission tech and smart grid in Brazil
 - StateGrid acquisition of several transmission line companies

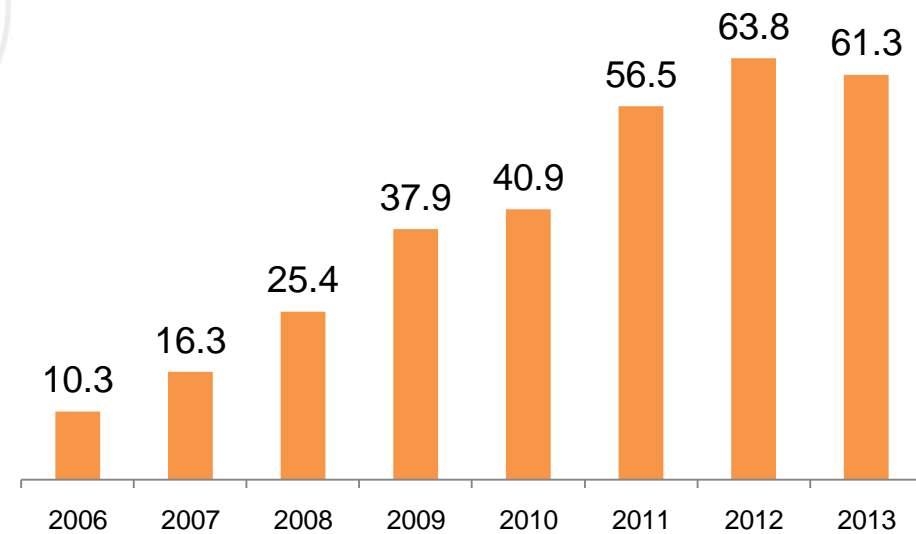
New Clean Energy Investment



Brazil Clean Energy Investment (\$bn)



China Clean Energy Investment (\$bn)



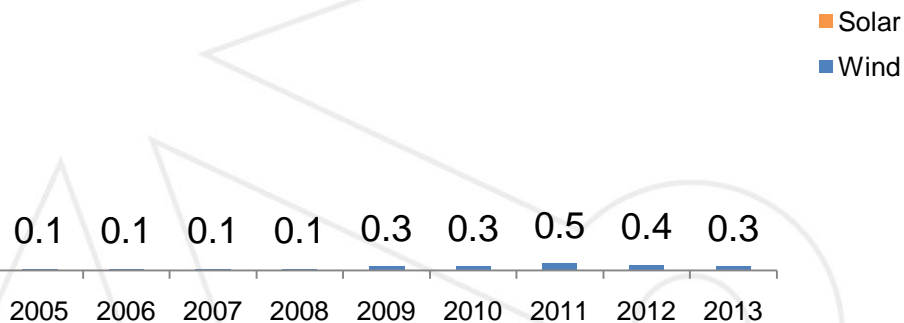
Clean energy includes: solar, wind, biofuels, bioenergy, small hydro, geothermal (does not include large hydro over 30MW)

Source: Bloomberg New Energy Finance

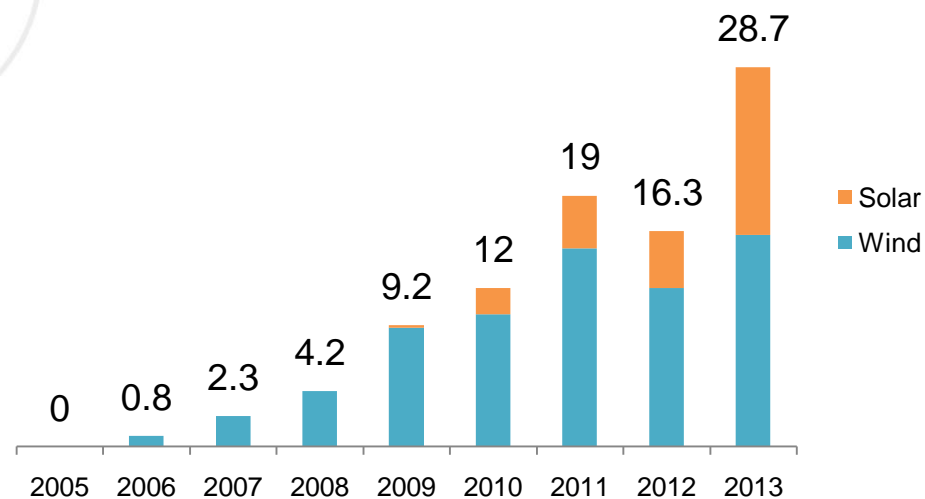
Wind and Solar New Capacity Add



Brazil New Capacity Add (GW)



China New Capacity Add (GW)



Source: Bloomberg New Energy Finance

Opportunities for Investment in Renewable Energy



- **Wind**

- China experience in wind deployment: 90GW installed
- China wind turbine technology: Sinovel, Goldwind
- Brazil growing wind market: 2 GW per year

- **Solar**

- China experience and cost efficiency in PV deployment: 18.1 GW installed
- China PV component manufacturers: Yingli Solar, GCL Solar, Hanergy Solar, Trina Solar
- Brazil potential market: solar auctions as of 2014

Bottlenecks for Investment in Renewable Energy in Brazil (1/2)



- **Local Content Rules: BNDES**

- BNDES only finances projects with local content rules

- Wind: Chinese companies would have to set up local equipment manufacturing capacity in Brazil; has not happened yet

- Solar: local content rules not defined yet; Chinese companies studying the possibility to enter the market and **how**

Bottlenecks for Investment in Renewable Energy in Brazil (2/2)



- **Chinese Development Bank or equivalent financing?**
 - Currency risk: who will hedge the risk of financing in Yen vs PPA in Reais?
- **Restrictions on Acquisition of Land**
 - Bioenergy and biofuels: Brazil's restrictions on acquisition and ownership of land by foreigners (legislation)

Emblematic Chinese Investments in Brazilian Renewable Energy



- 2011: Three Gorges acquires Energias de Portugal EDP
- 2012: Desenvix contracts BRL 100m financing from China Development Bank for development of 35MW wind farm using Sinovel turbines – only example
- Biofuels: China National Heavy Machinery Corp interest in investing in Brazilian biofuels industry
- 2014: Eletrobras (Furnas) and Chinese partner expected investment in wind in Brazil and China

... Still very few in clean energy in Brazil, which exemplify the difficulties and bottlenecks to be overcome...



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