China Wind Industry: lessons for domestic policy interventions and international support

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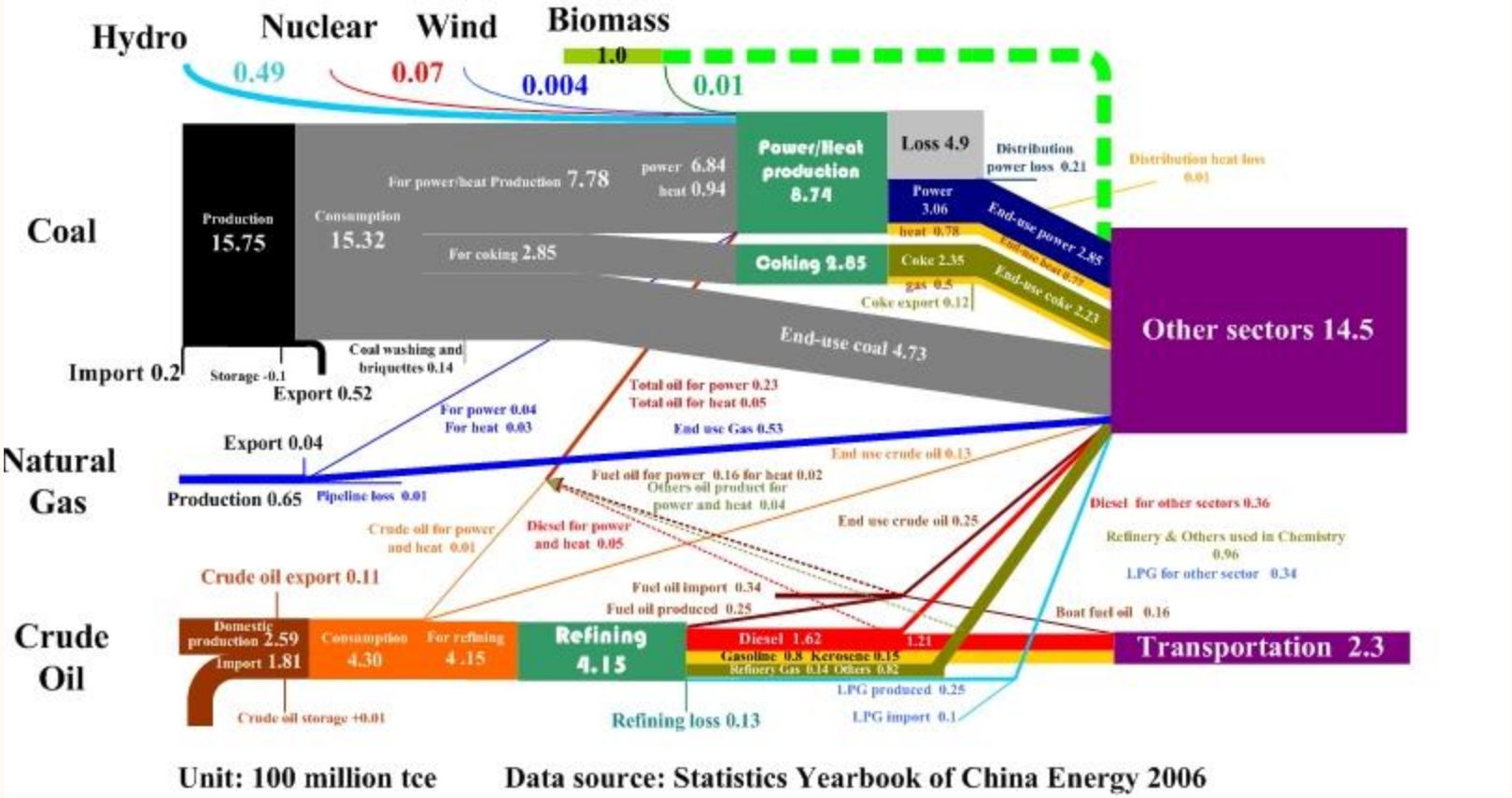
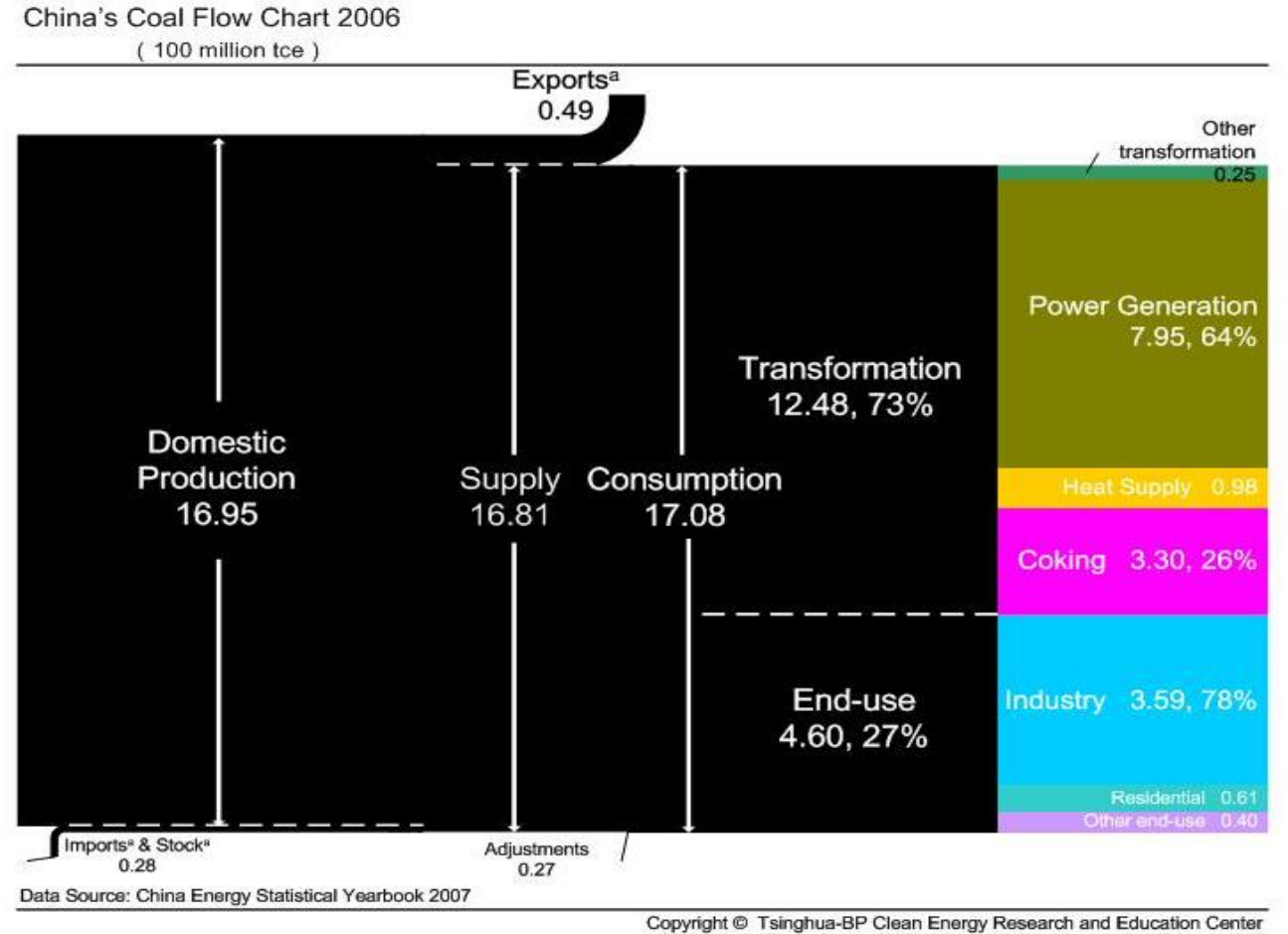
Energy Supply Chains in China



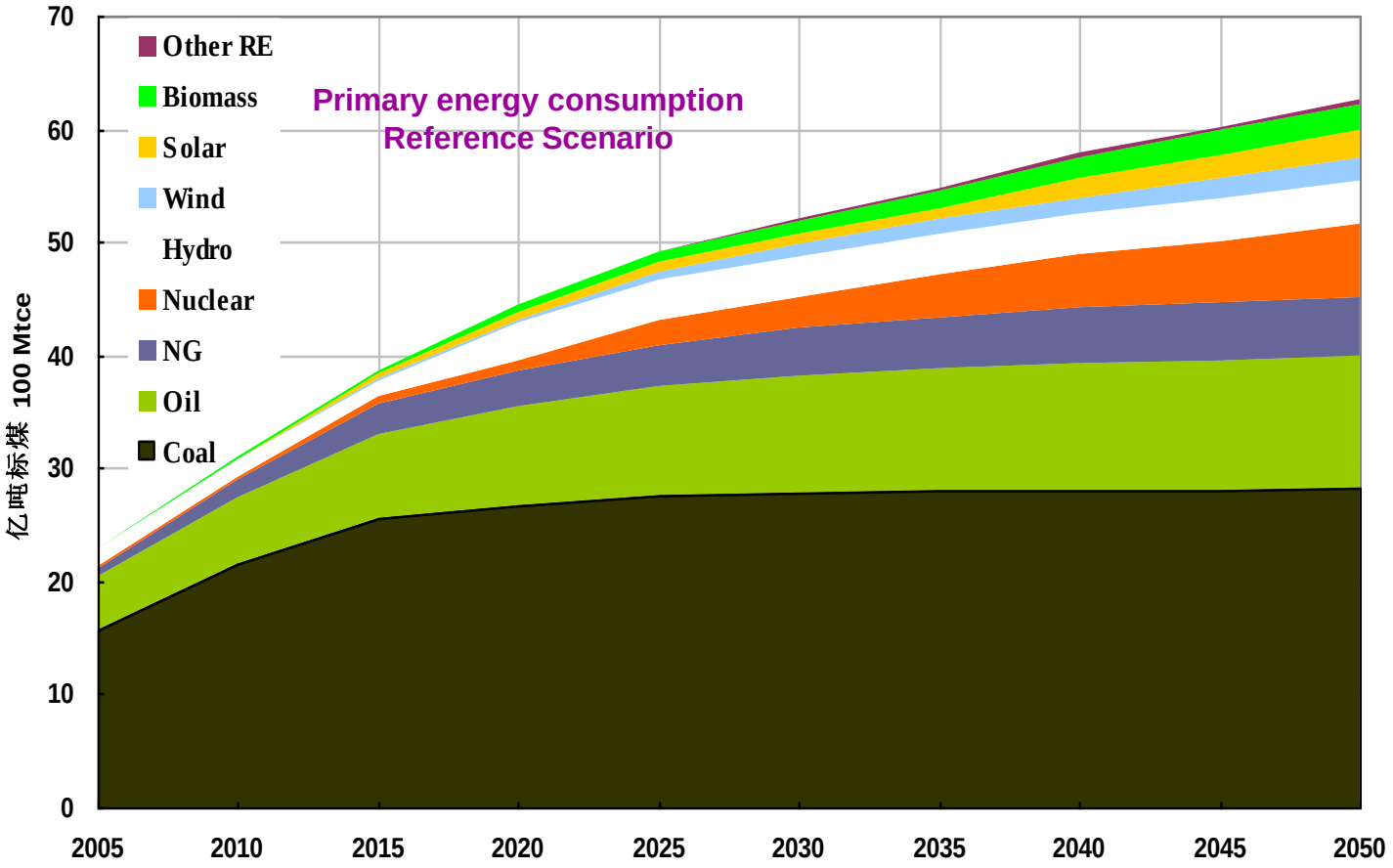
Unit: 100 million tce Data source: Statistics Yearbook of China Energy 2006

China's coal flow in 2006

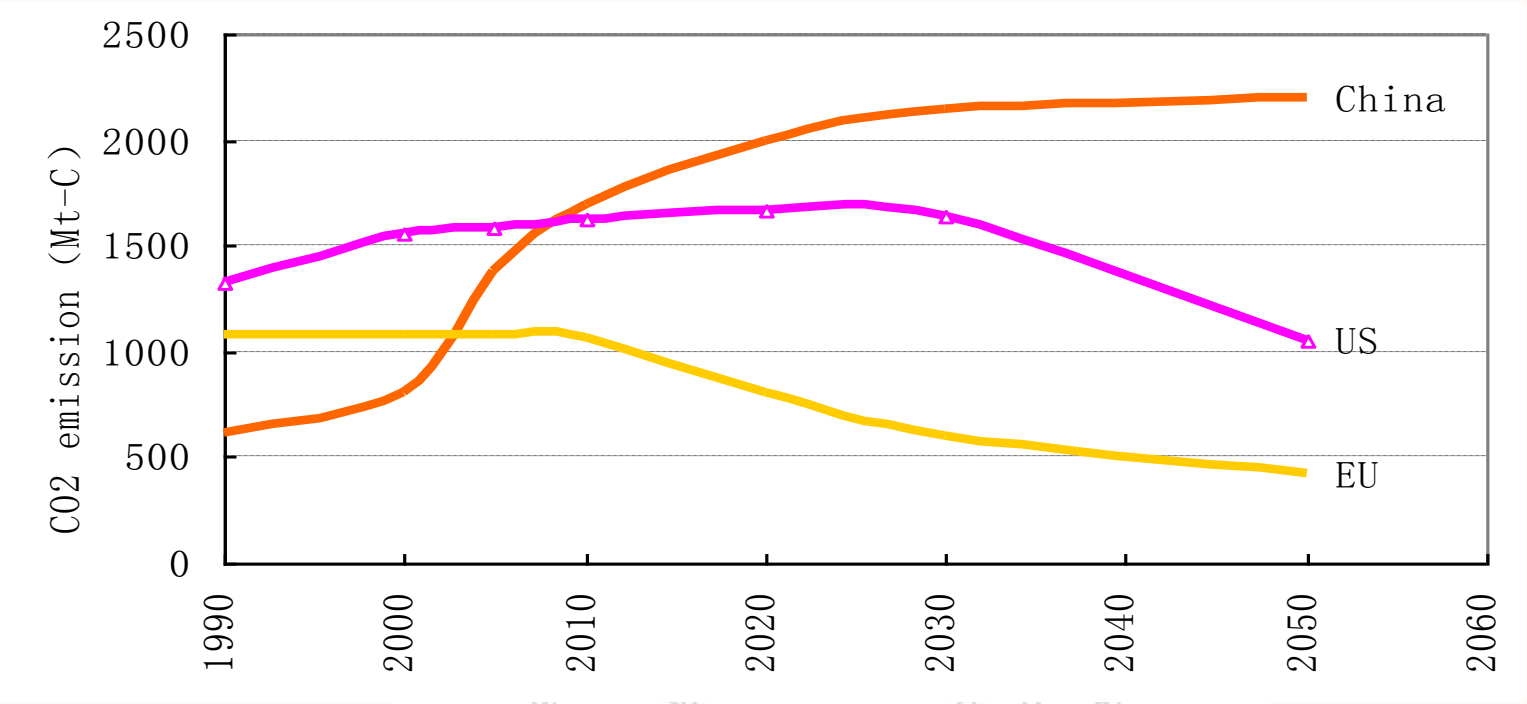
Power generation: 47%; Industry:21%; Coking: 19%



China's primary energy supply

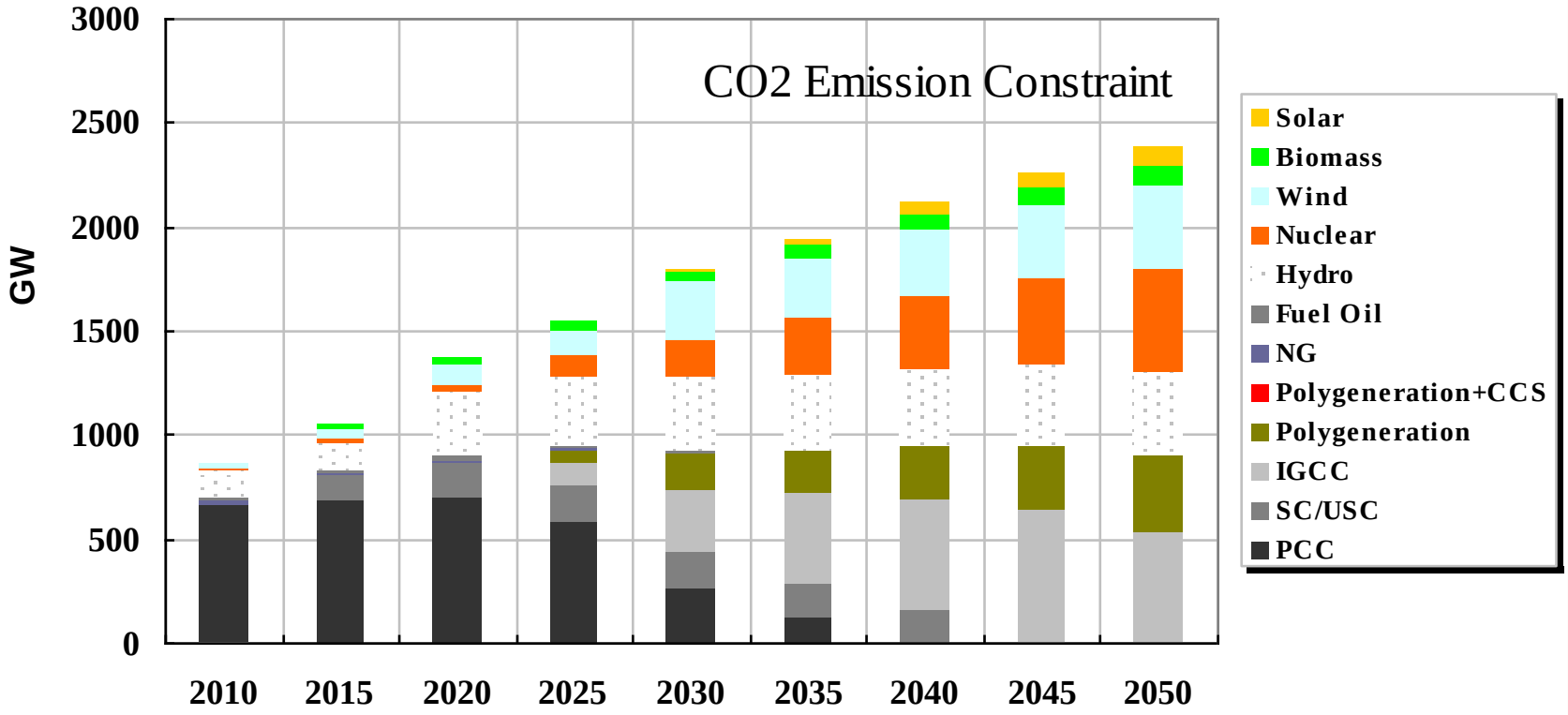


The volume of CO_2 emission is huge and the growth has been fast in China, posing challenges for mitigation.



China's share of CO_2 emission in the world was 18.7% in 2005, and China could become the World's largest CO2 emitter by 2008.

A power supply scenario under CO2 emission control



Domestic Policy Interventions

- Renewable Energy Law
- Mandatory Renewable Market Share
  - **RE: 10% in 2010 and 15% in 2010 of primary supply**
  - **NH-REP for electricity producers: 3% in 2010 and 8% in 2020**
  - **NH-REP for the grids: 1% in 2010 and 3% in 2020**
- Concession Program
  - **PPA**
- Power Surcharge for Renewables
- Relief of VAT and Duty
- Public R&D

Indicators of Domestic Public Policies

	CP	LR	CP+ LR	RPS	CP+ LR +RPS	CS	FFI	RD&D
Capacity installed	+	+	+	+	+		+	
Domestic Manufacture capacity		+	+		+		+	
Local economic/ social development	+	+	+	+	+	+	+	
Power Cost/Price reduction	+	+	+		+		+	+
R&D capability			+		+		+	+

Notes: += Direct positive contribution; CP= Concession Program; LR=Localization Requirements; CP-LR=Concession Program plus Localization Requirements; RPS=Renewable Portfolio Standards; CP- LR –RPS= Concession Program plus Localization Requirements plus RPS; CS=Cost-sharing mechanism and Renewable Energy Premium; FFI=other Fiscal and Financial Instruments (Exclude CS); RD&D=Research, Development and Demonstration.

Wind Technology Transfer Mechanisms in China

Manufacturer	Technology list	Technology transfer		
		Time	Collaborator	Mechanism
Sinovel	1.5MW	2003	German Fuhrlander	Jointly develop
	3MW	2007	Austria Windtec	Jointly develop
	5MW	2007	Austria Windtec	Jointly develop
Goldwind	660kW	1997	German Jacobs	Licensing
	750kW	2001	German REpower	Licensing
	1.5MW	2005	German Vensys	Jointly develop
	2.5MW, 3MW, 5MW	2008	German Vensys	Purchasing the foreign company
Dongfang Electric	1.5MW	2004	German REpower	Licensing
	2.5MW	2005	German Aerodyn	Jointly develop

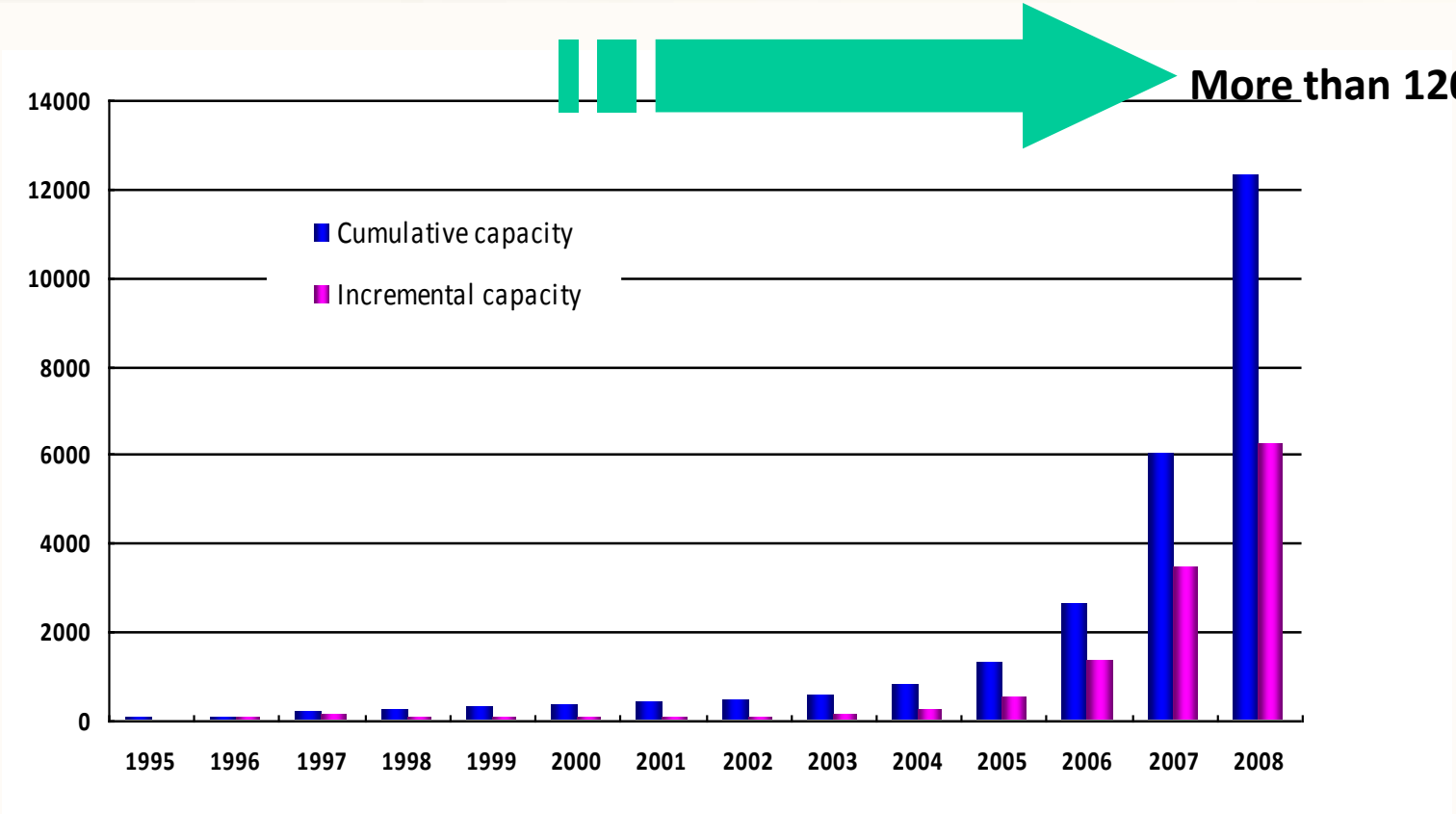
A stakeholder analysis of wind technology transfer in China

Stakeholders	Motivations/Objectives	Actions
Domestic companies	● Technology leapfrogging ● Increased Intellectual property ● More market share ● Brand recognition	● Licensing ● Jointly develop ● Joint venture
Foreign companies	● More profit from licensing sales ● Increased market share in China ● Lower labor cost in china ● More financial return ● Understand China wind conditions	
China government	● Lower cost of wind turbine manufacturing ● Address energy crisis and climate change ● Economy development of wind industry ● Technology leapfrogging ● More job opportunities	● Value added tax reduction ● Guarantied grid connection ● Premium ● R&D ● Custom duty relief ● Favorable loan
Foreign governments	● Improved reputations in fulfilling their UNFCC financial and technology obligations under UNFCCC ● Assisting the wind companies in occupying more Chinese wind power market	● Financial support for purchase of foreign wind turbines ● Protecting intellectual property ● Joint esearch and development ● Help capacity building

Clean Development Mechanism

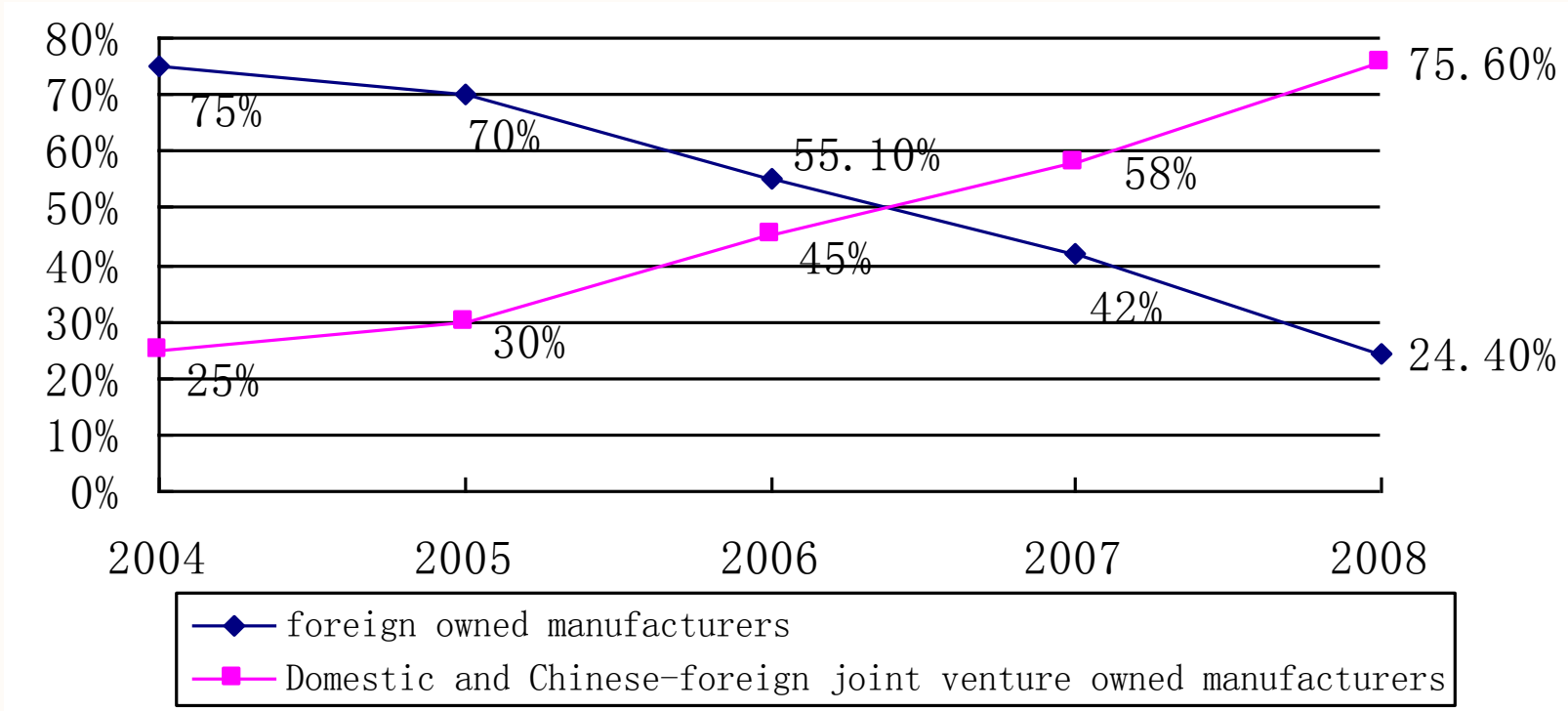
- By the end of April 2009, the Chinese Government approved 1766 CDM projects in total, and 337 of them were wind power projects;
- Approximately 95% of the wind power projects which do not belong to the Wind Concession Program are of CDM projects; and
- The wind farm investors could get an economic incentive of approximately 10 cents/kWh on average from CDM projects.

Wind Power Capacity Installations in China



Source：Li & Gao, 2008

Wind Power Market Structure Change



Suggestions on Policy Indicators

- Installed capacity
- Wind power price
- Domestic manufacture capacity - Market share of domestically manufactured wind turbine
- Technology R&D capability - Size of wind turbine
- Legislation for IPR protection
- Number of patent applications and authorizations

Thanks for your attention!

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