

北京大学

Market Mechanism of Wind Power Generation in China

BELL Program – Wind Power Team



Gone with the Wind





Mr. Guoliang ZHAI, Peking University

The Importance of Developing Wind Power

The Importance of Developing Wind Power



- Increasing demand of electricity in China
- Scarcity of fossil fuel and national energy security
- The severe pollution caused by fossil fuel

“Among all the reproducible energies, the wind power is most economical, it is being most quickly developed and most widely commercialized”

- Mr. Dinghuan Shi, the secretary-general of
Department of Science and Technology, China



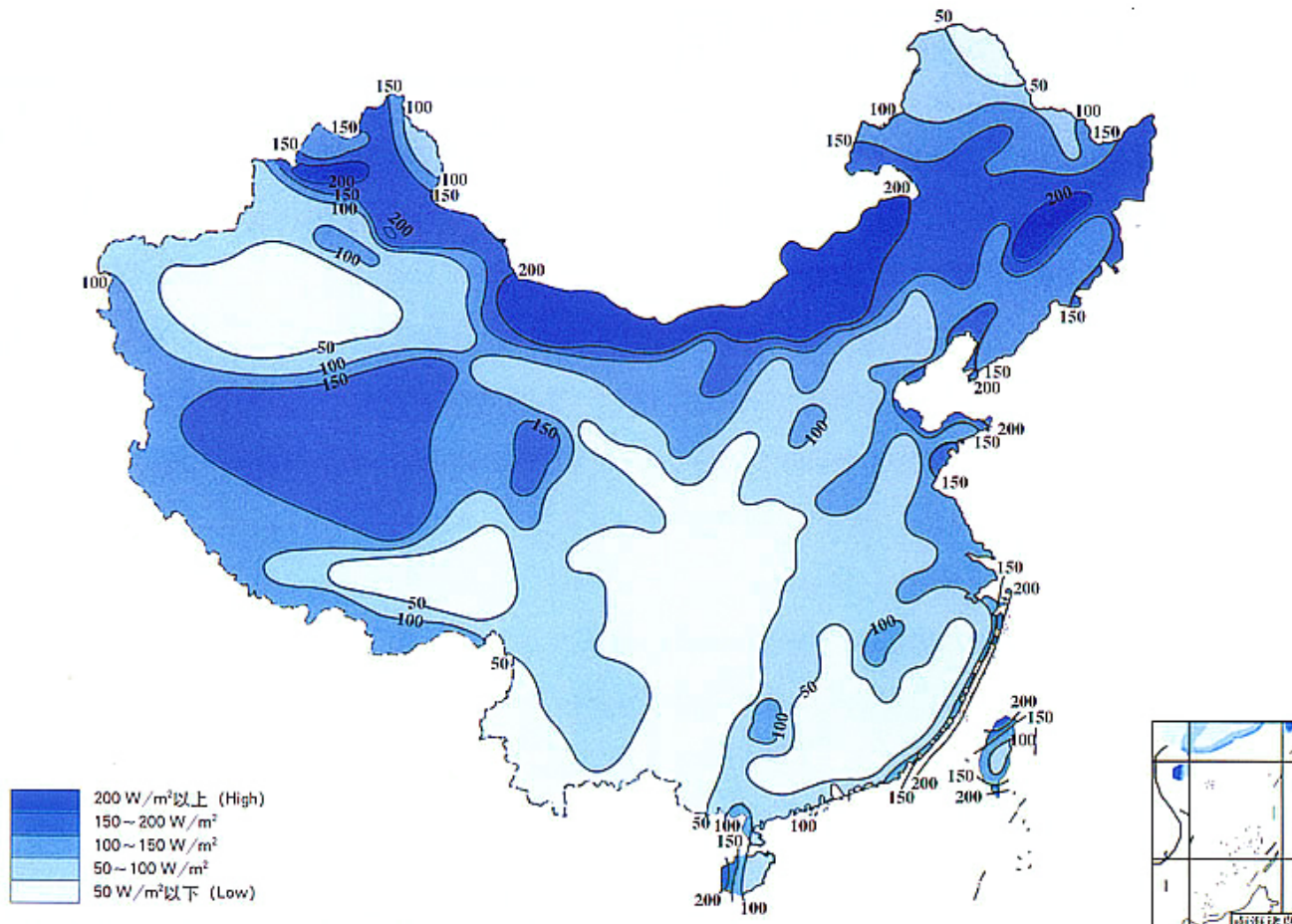
Abundance of Wind Energy in China

The potential wind energy in China is among the most abundant in the world. The available power energy of 10m above the ground is 253GW.

	Abundant Area	Relatively Abundant Area	Available Area	Indigent Area
Time of wind speed >3m/s (hr/a)	>5000	5000~4000	4000~2000	<2000
Time of wind speed >6m/s (hr/a)	>2200	2200~1500	1500~500	<500
Density of wind energy (w/m ²)	>200	200~150	150~50	<50
Percentage to total area of China (%)	8	18	50	24



Distribution of effective wind power density in China





Mr. Yong LIU, Peking University

Wind Power Development in China

Wind power development worldwide



Total installed wind power capacity increased from 2 GW in 1990 to 31.84 GW in 2002, 15.92 times of the scale 13 years ago.

The main types of wind turbines, 500,600 and 750 kW, is appropriate for large-scale commercial power generation

- Increased Turbine Size
- R&D Advances
- Increased scale of development

1979:
cents/

- Increased Turbine Size
- R&D Advances
- Manufacturing Improvements



NSP 107 MW Lake Benton wind farm
4 cents/kWh (unsubsidized)

2004: 3 – 4.5 cents/kWh

Development of wind power in China



A great achievement has been gained in China's wind power development, in spite of the late starting.

China boasts the largest number of mini wind turbines in the world, totaling 150,000 sets.

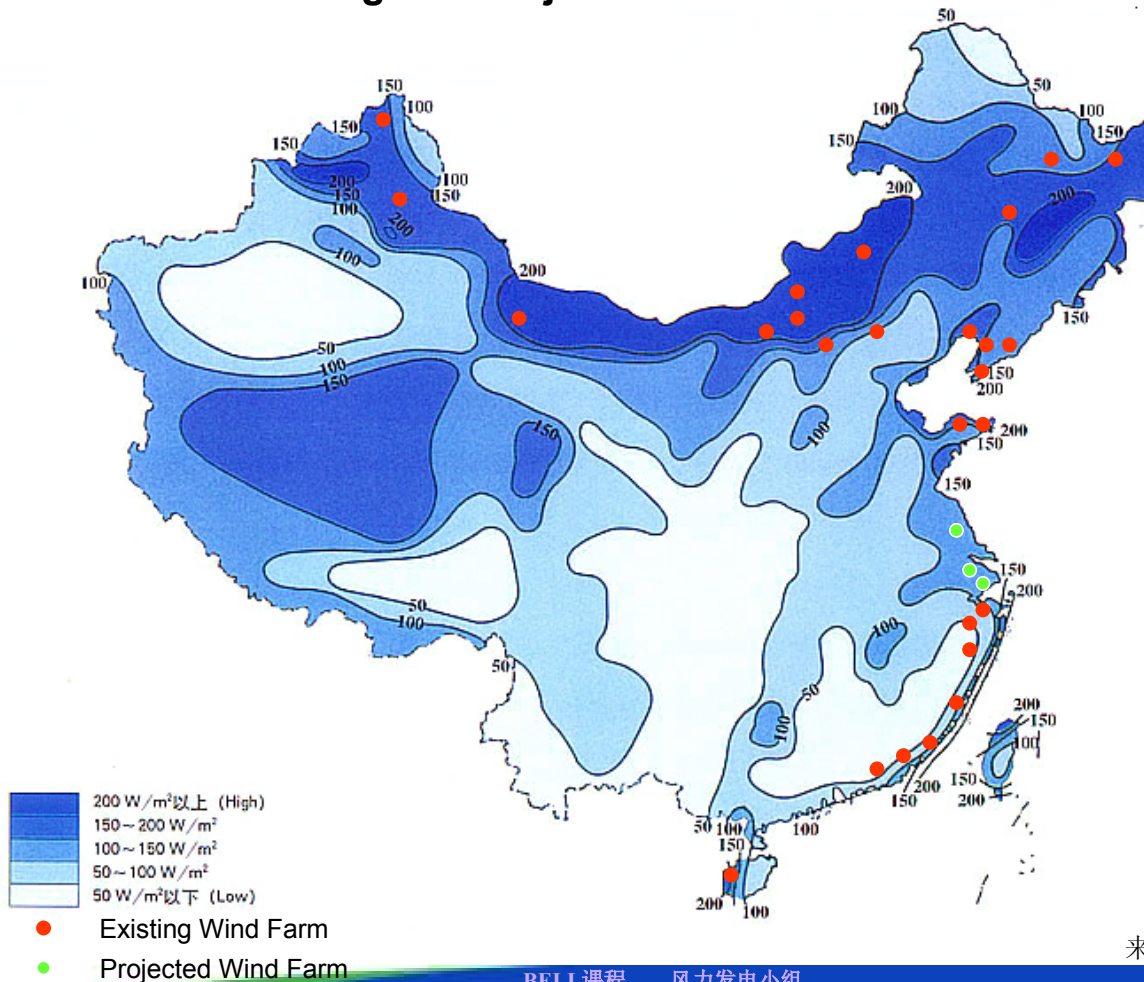
The rate of localized manufacturing of key equipment keep increasing. Up to 2003, 12% of the wind power generating equipments are produced domestically.

More than 40 wind farms had been established in 14 provinces up to December 2003. 1042 wind turbines contribute to a total capacity of 567.4 MW.

Wind Farms in China

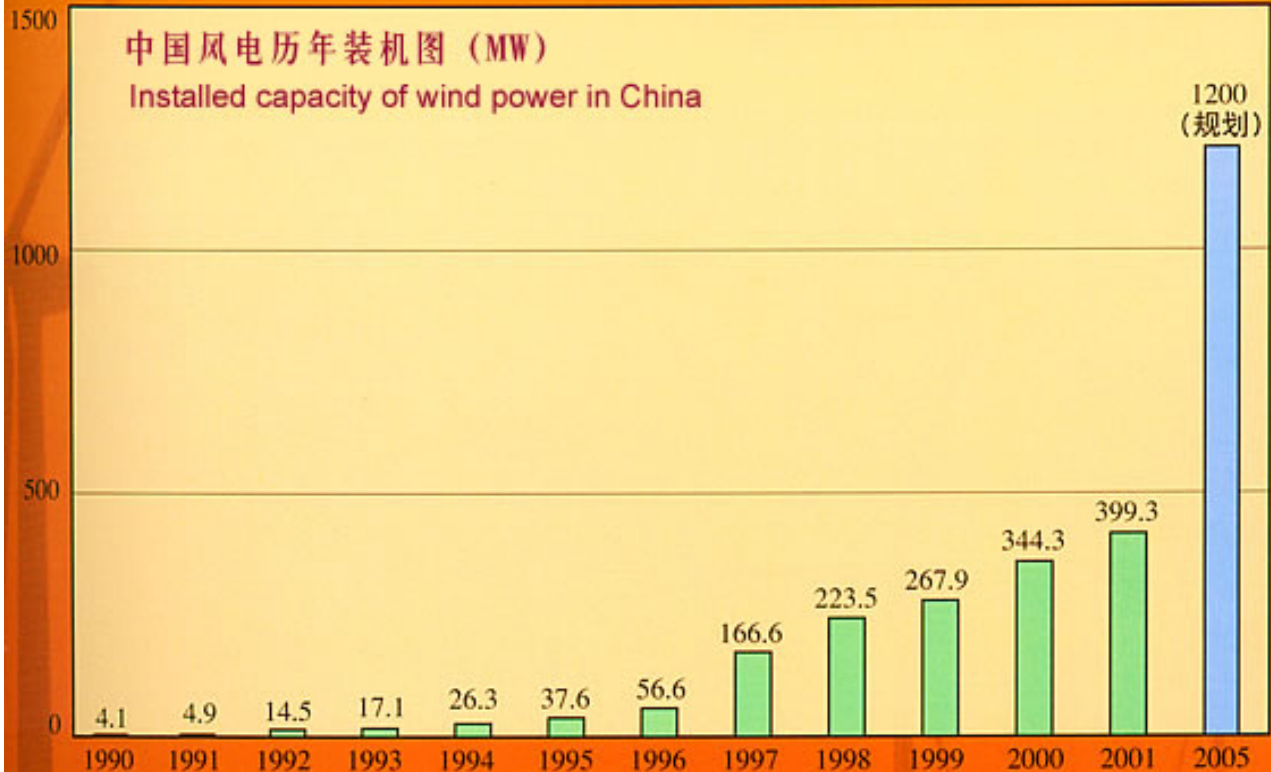


Location of Existing and Projected Wind Farms in China

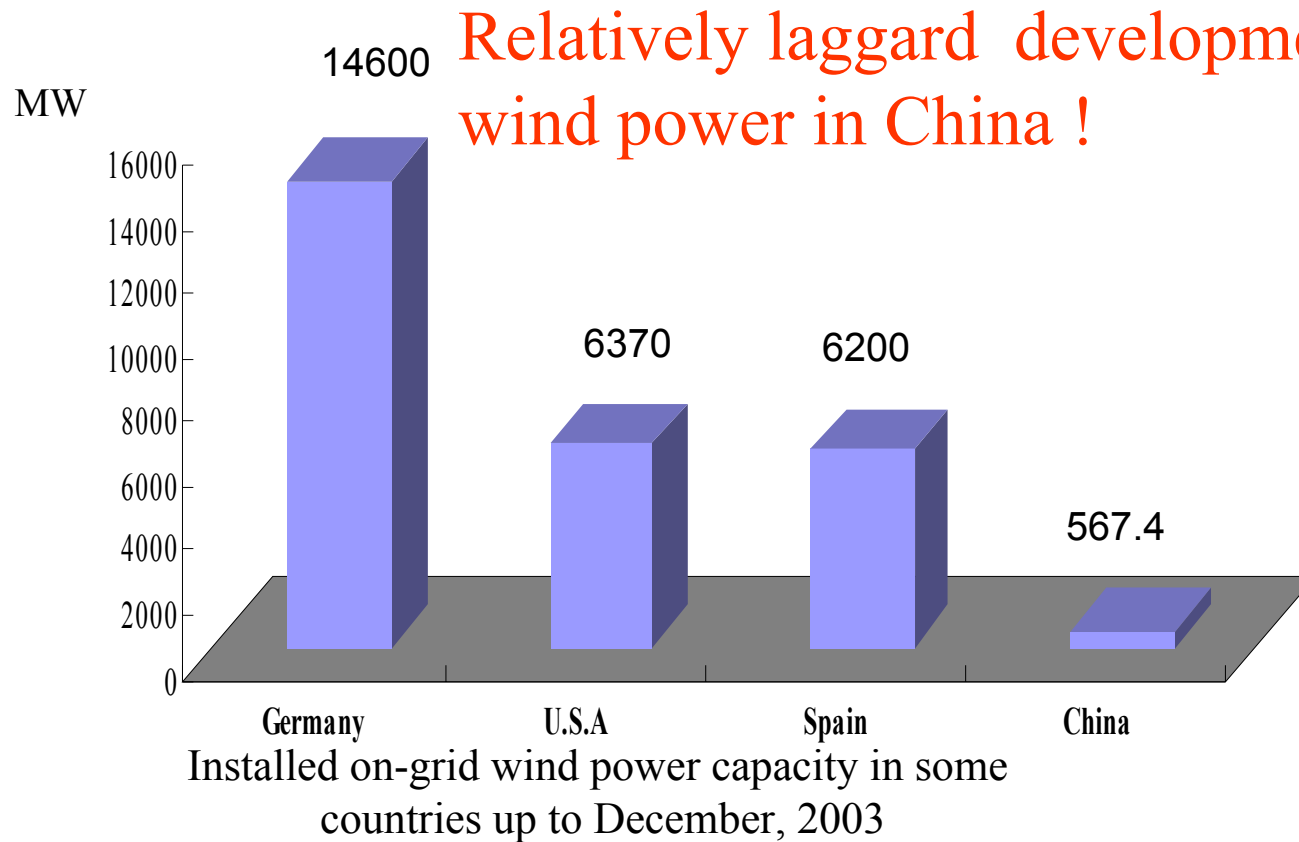


来源：全国风电信息中心

Installed capacity of wind power in China



Comparison of wind power between China and other countries



Source: Xinhua News in May 15, 2004



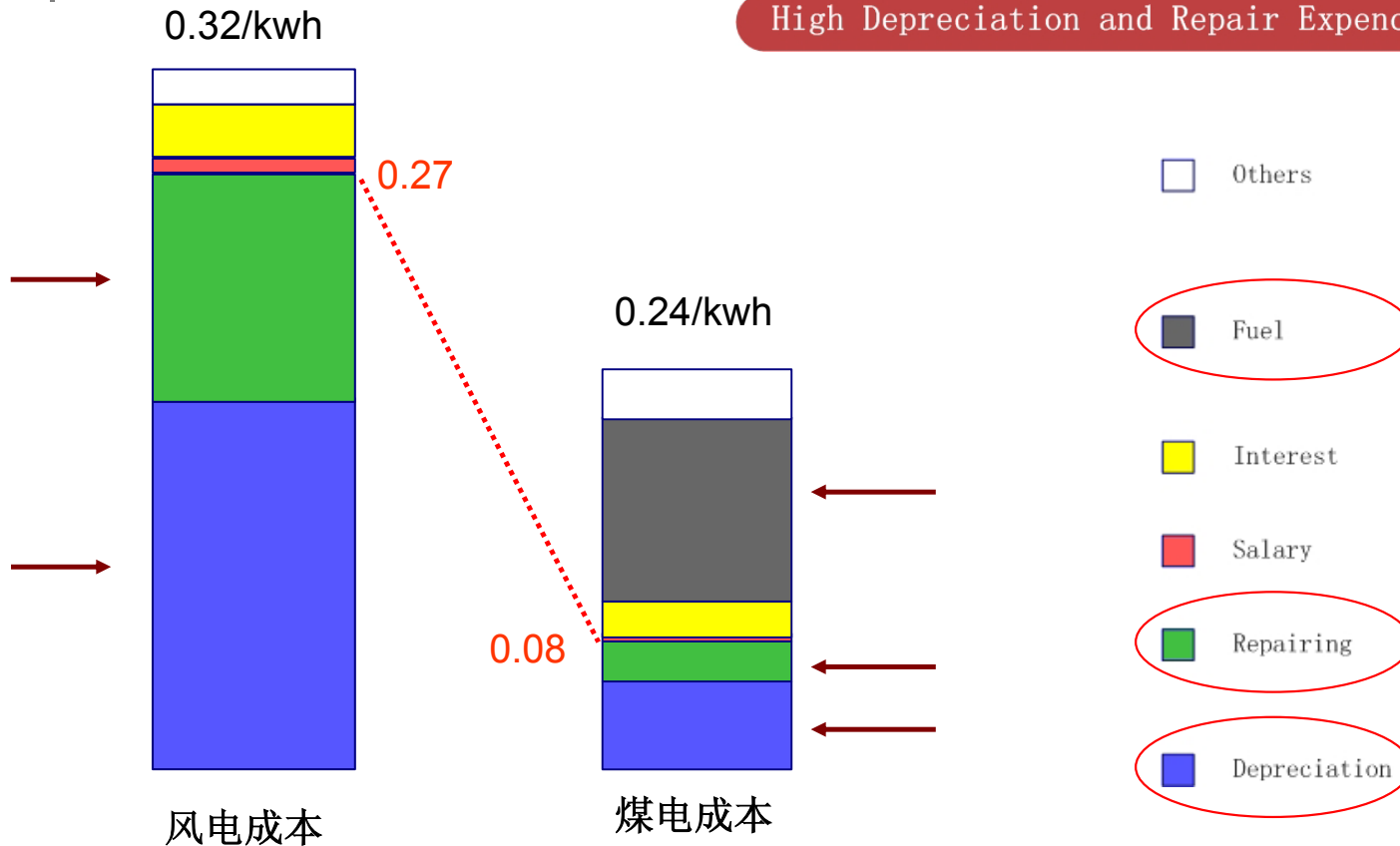
Mr. Zhenglu WANG, Tsinghua University

Problems in China's Wind Power Development

Cost Analysis of China Wind Power



High Depreciation and Repair Expense



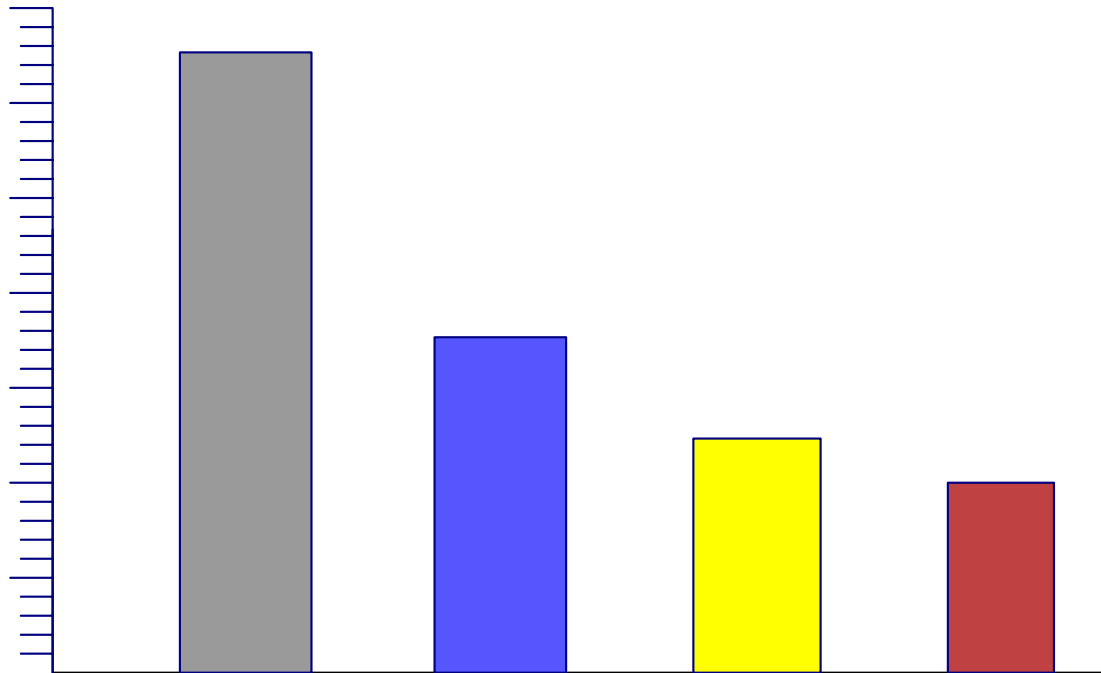
Reference: Zhang Zhengmin

《The Incentive Policy Research of Economy on Wind Power Generation in China》

Cost Analysis of China Wind Power



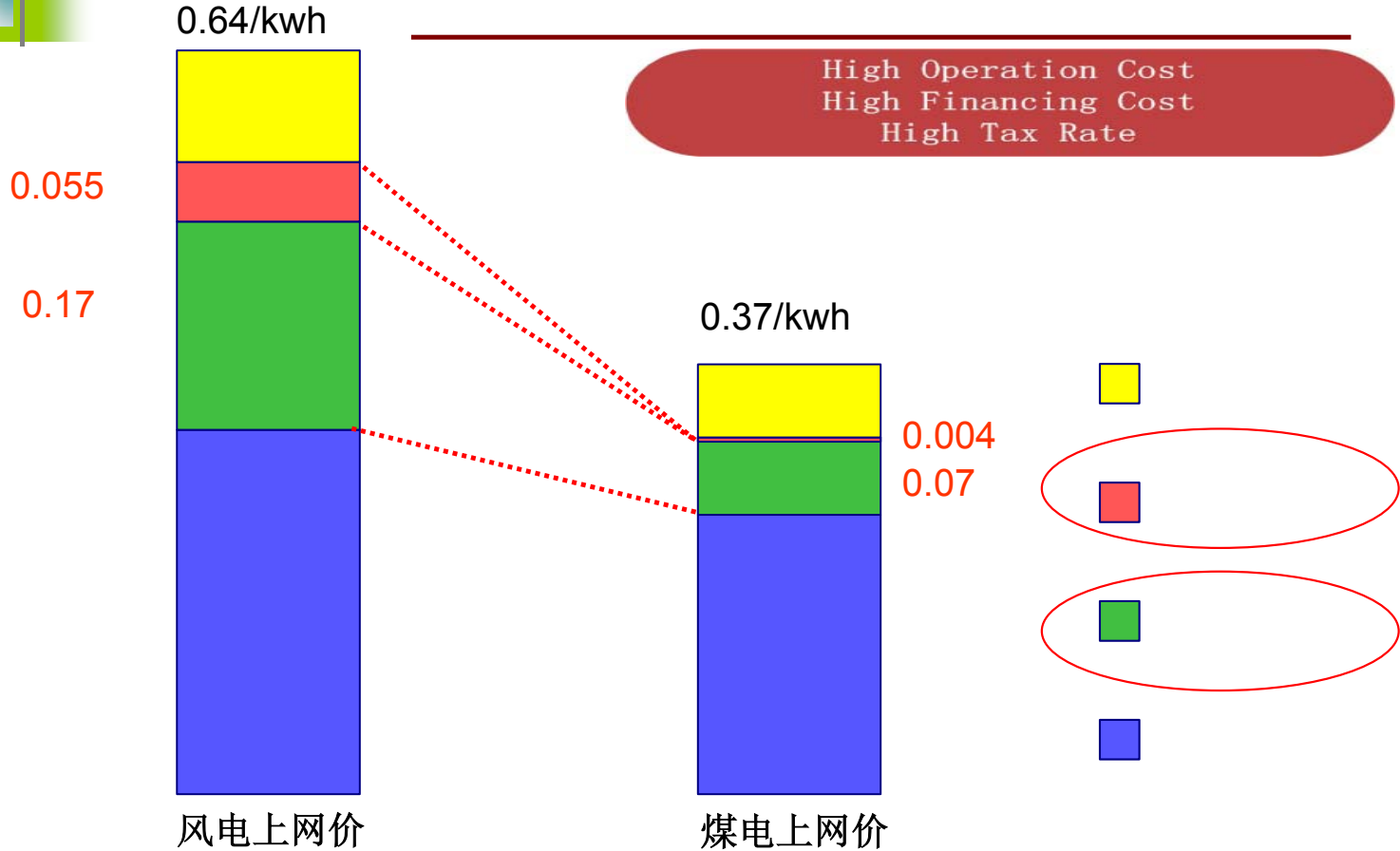
Fewer Annual Operating Hours



Reference: Zhang Zhengmin

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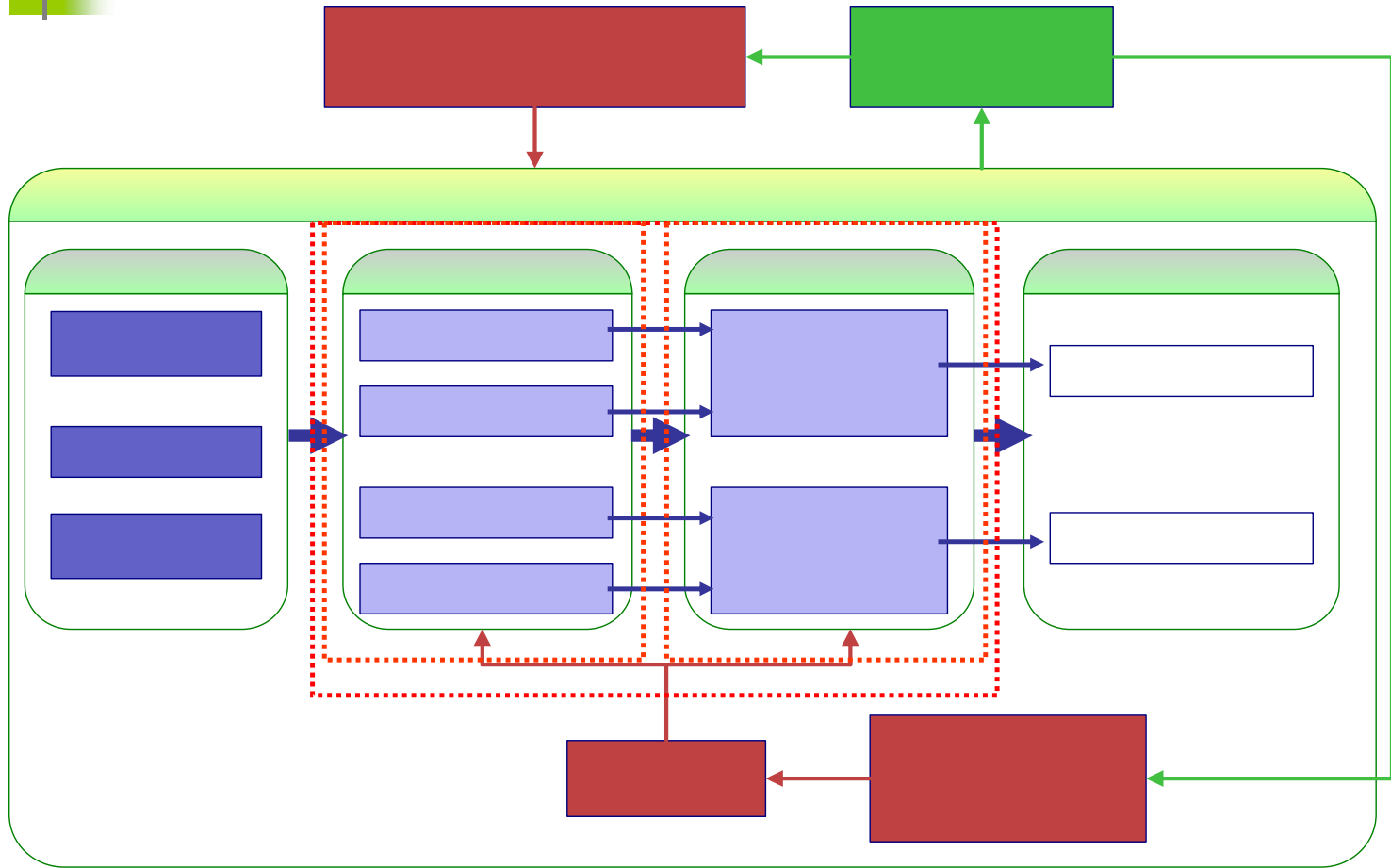
Price Analysis of China Wind Power



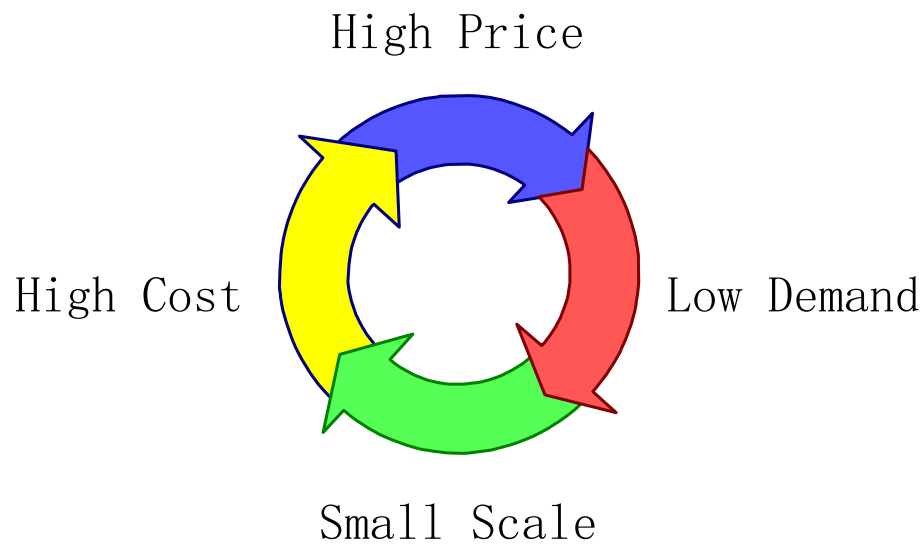
Reference: Zhang Zhengmin

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Industrial Chain of China Wind Power



Problems of China Wind Power



Reason for High Price



Value-added tax and income tax for wind farms are higher than ordinary power plants, though many action had been taken to relieve wind power operators of high taxation.

Wind farm operators can hardly get low interest and long term loans from commercial banks, who regard wind power as a high risk industry.

No favorable policy in China allowing wind farm operators to accelerate the depreciation of their facilities, which is normal case in western countries.

The “Cost plus profit” way of wind electricity pricing guaranteed wind farm investor’s interest, but hindered the competition between wind farms, who have no incentives to drive down their cost.

Reason for Weak Demand



There are government regulations that the power grid company should purchase all the wind power electricity, but these regulations are not legal obligation.

Environment cost are not included in electricity generated by ordinary power plant. Cheap ordinary power electricity restrained the demand for cleaner but more expensive wind power.

Although utilizing wind power benefits the whole society, the cost are carried by local power grid company. There are no mechanism to share the cost among all the electricity consumers in the country.



Miss. Yongping Zu, Tsinghua University

Our Suggestions

Our Suggestions

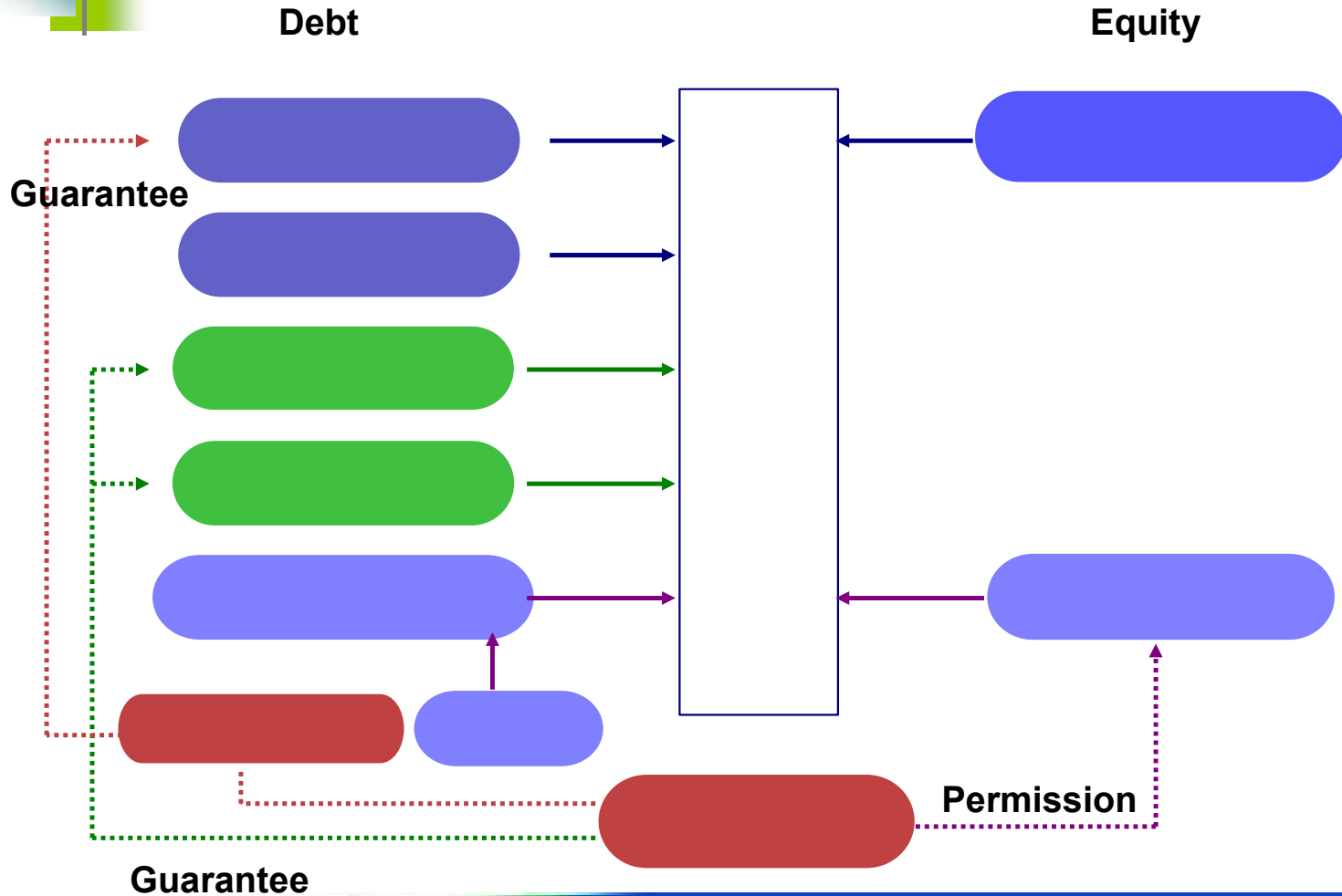


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- Cut down tax rate.
 - Give subsidy to wind farms.
 - Allow wind farm operators to accelerate the depreciation of their equipment.
 - Assist financing activity of wind farm operators.

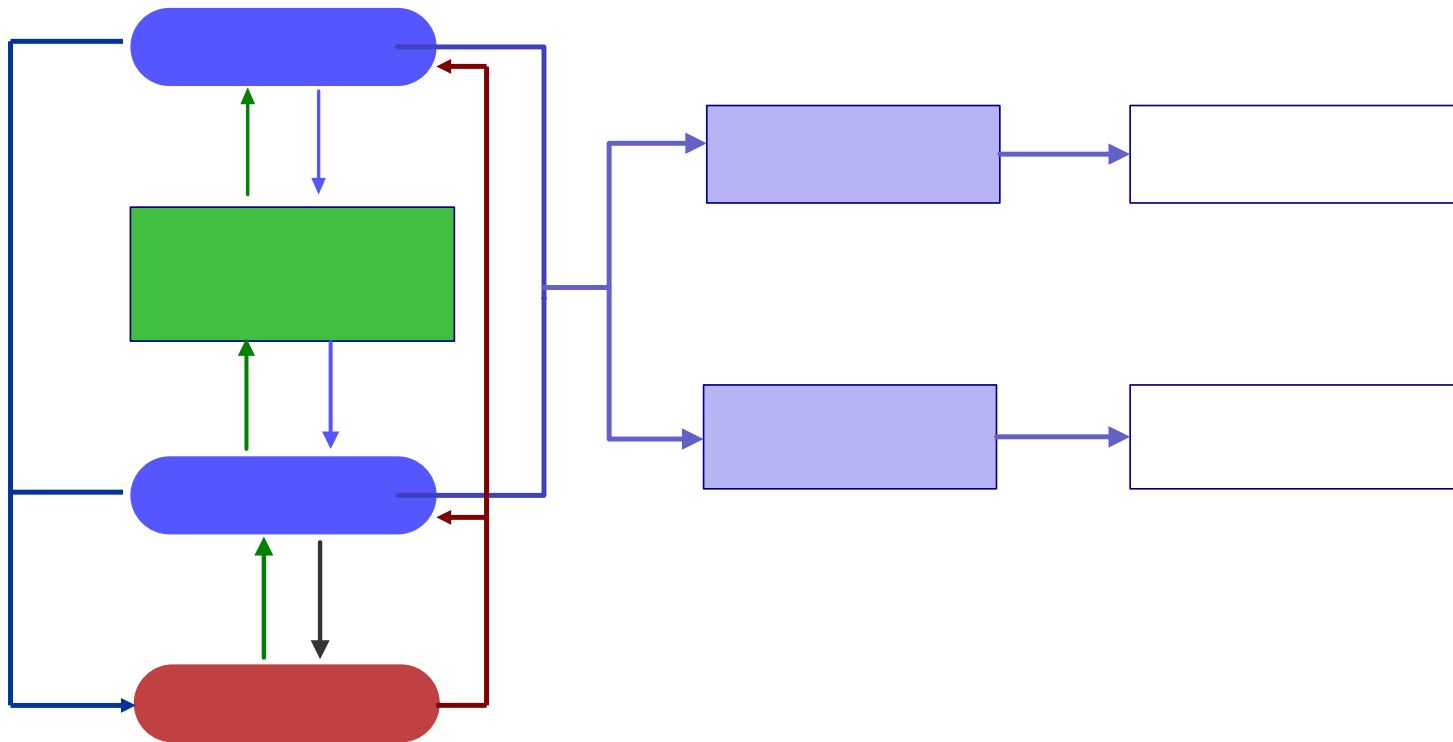
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- Enforce power grid company to purchase the electricity generated by wind farms through legislation.
 - Determine wind power electricity price by market mechanism.
 - Establish green certificate market to realize the environmental value of wind power electricity.

Utilize CDM to get financial and technical support from developed countries.

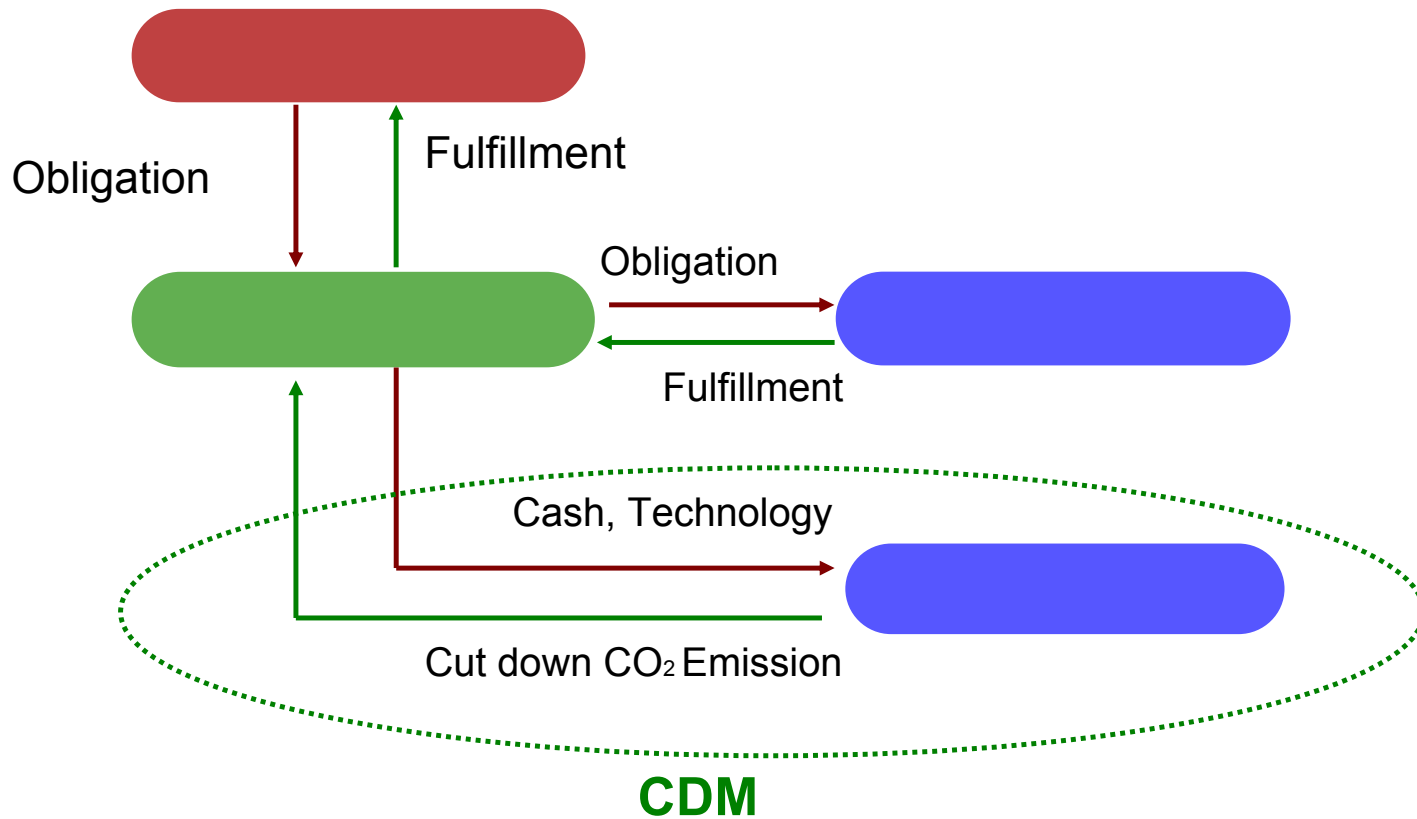
Financing of Wind Power Industry



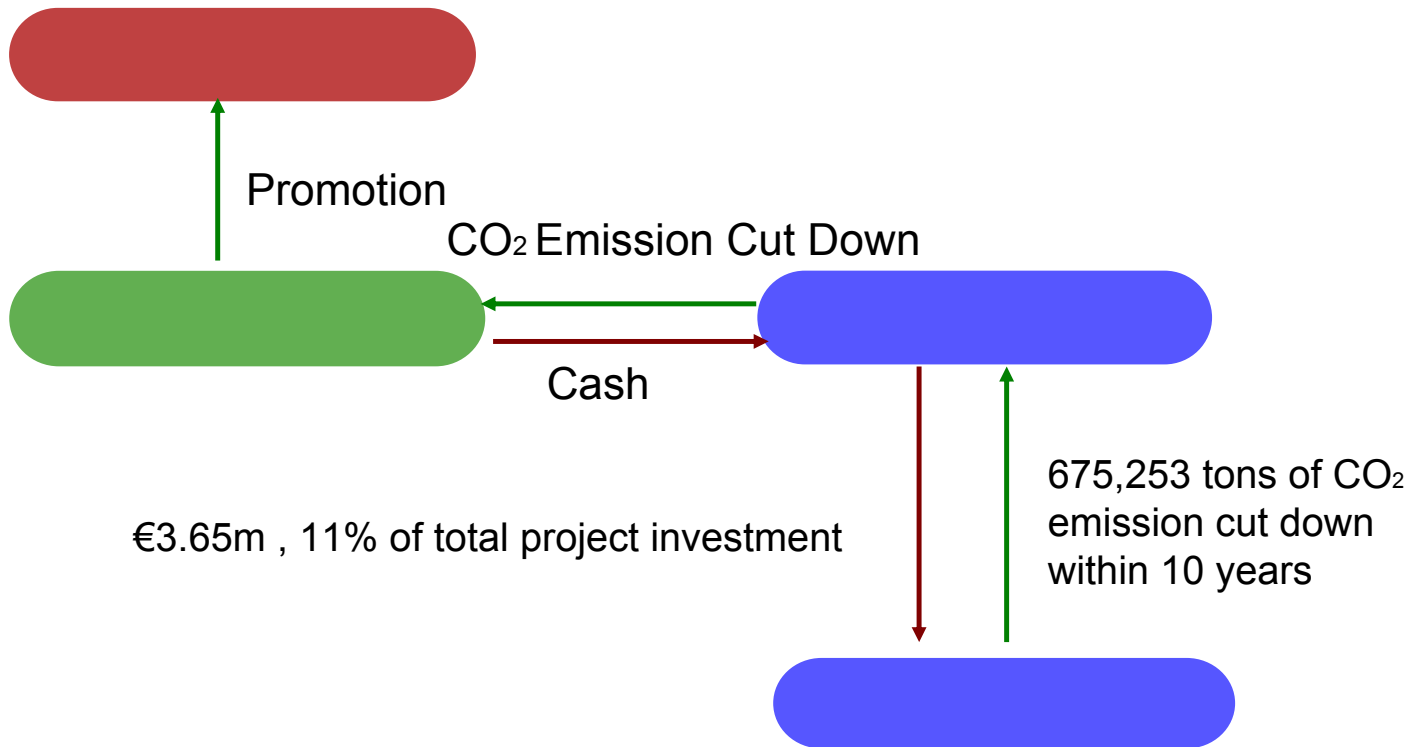
Establishment of Green Certificate Market



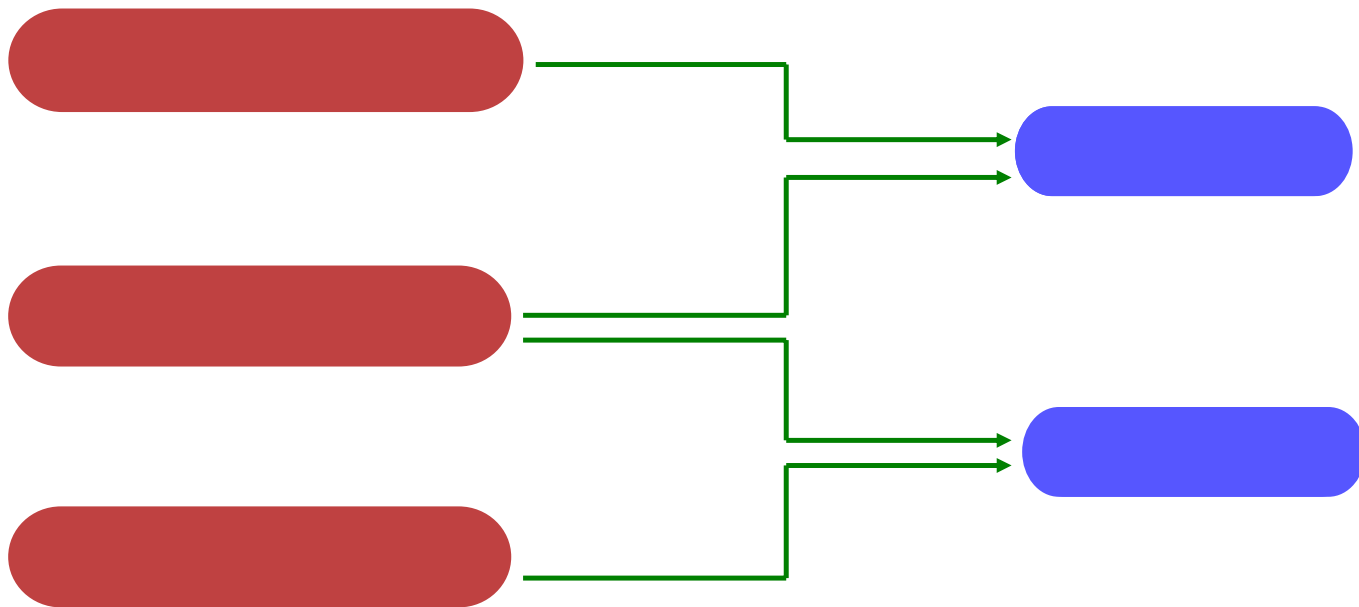
Utilization of CDM



Example of CDM: Hui-teng-ge-le Project, Inner Mongolia



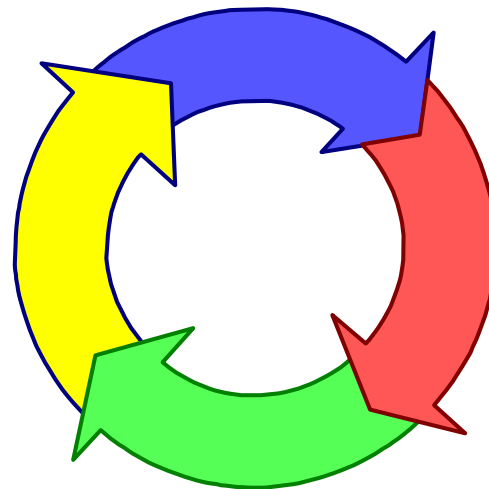
Our Solutions





Low Price

Low Cost



More
Demand

Large Scale



Mr. Guoliang ZHAI, Peking University

The Future of China's Wind Power Generation



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- Cut down of value-added tax
 - Research on Green-Certificate Market mechanism
 - “Volunteer purchase” of green electricity in Shanghai

-
- The largest Wind Farm (100 MW) in China is under construction. The on-grid price had been reduced to reasonable RMB0.478 /kwh.
 - Government’s target of 1,200MW wind power capacity in 2005 & 3,000 MW in 2010.

...is Blowing in the Wind



Photo by cloud

Thank you!

