



Wind Energy in China: Status of Technology Development and Application

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3. Main factors for China wind power development
4. Main barriers for further development of wind power
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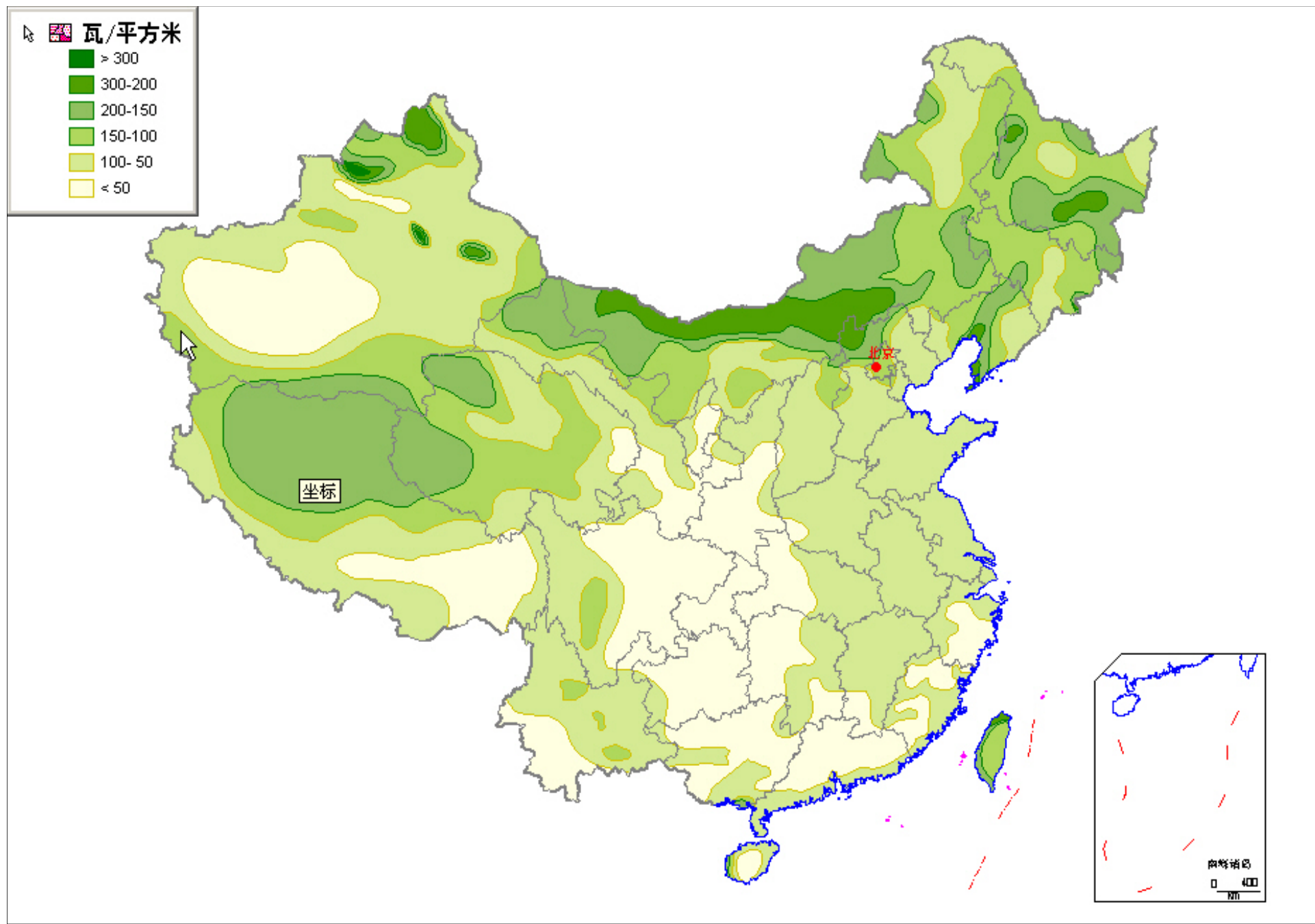
1. Introduction

- In the past decade, the installed wind power capacity of China has been increasing fast.
- The incremental wind power installed capacity in 2004 was 197MW.
- The accumulation of wind power capacity reached 764.37MW at the end of 2004, 35% more than the last year.



1. Introduction

- China has abundant wind resources, which mainly distribute in the northern inland and eastern coastal regions.
 - The practical wind energy potential on the Chinese mainland is 253 GW.
 - The offshore wind energy potential may be three times greater than the onshore potential.



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1. Introduction

- The National People's Congress of China has endorsed the Renewable Energy Law.
 - responsibilities of the government and society in developing and applying renewable energy
 - policies and measures to motivate economic bodies home and abroad to participate in the development of renewable energy.



1. Introduction

- The objective of this paper
 - Describes the status and barriers of wind power development in China.
 - Proposes the suggestions for resolving these barriers through North-South cooperation.



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2 Current Situations

- At the end of 2004, there were totally 43 grid-connected wind farms, where 1292 wind turbines were installed with the total capacity of 764.37MW.
- These 43 wind farms distribute in 14 provinces (municipalities/autonomous regions).

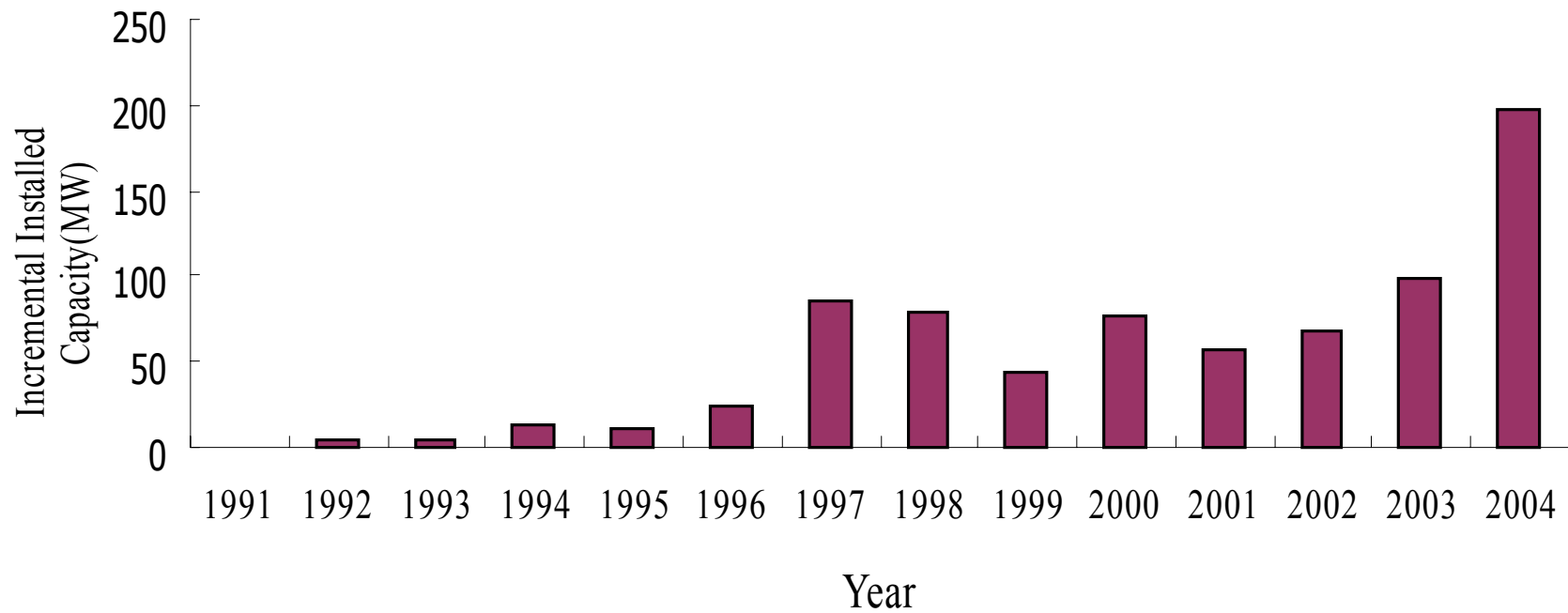


2 Current Situations

- Based on the installed capacity, the top 3 wind farms in China
 - Dabancheng No.2 (157 WT, 82.8MW)
 - Huitengxile (94 WT, 68.5MW)
 - Nan'ao (130 WT, 56.69MW)

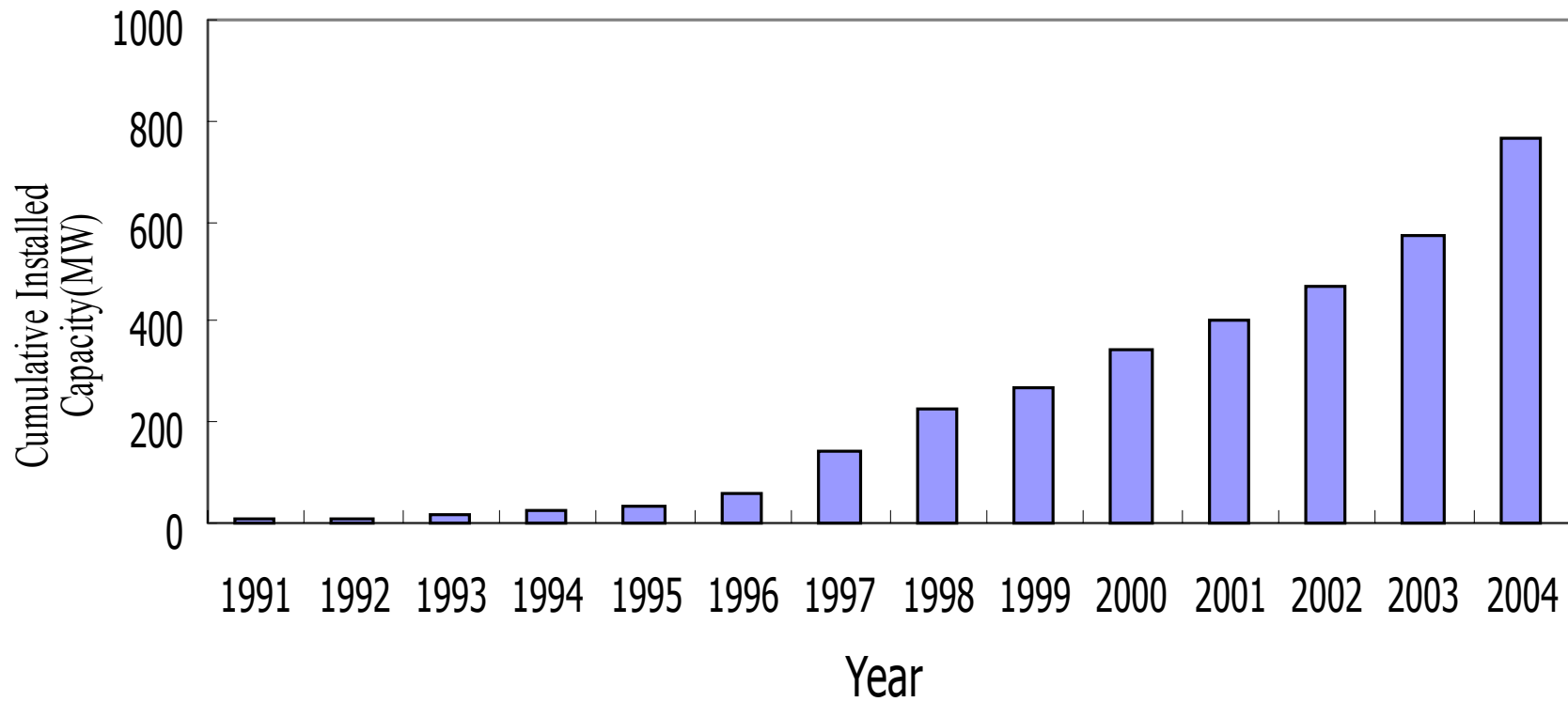


2 Current Situations





2 Current Situations





2 Current Situations

- The capacity of locally manufactured wind turbines is 135.83MW, only 17.8% of the total installed capacity.
- Others are imported from foreign countries. (628.54MW, 82.2%)



2 Current Situations

Tab. 1 Market share of Chinese manufacturers

No.	Company Name	Capacity(MW)	Percentage of total capacity
1	Goldwind	89.7	11.7%
2	Xi'an-Nordex	29.4	3.8%
3	Windey	6.65	0.9%



2 Current Situations

Tab. 2 Market share of foreign manufacturers

No.	Company Name	Capacity(MW)	Percentage of total capacity
1	NEG Micon	226.49	29.7%
2	Vestas	100.17	13.1%
3	Gamesa	92.2	12.1%



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3 Main factors for China wind power development

The wind power development in the past years is due to the following factors:

3.1 Policy and Market Development

3.2 Wind Power Concessions

3.3 Research and Development Programs

3.4 International Cooperation Programs



3 Main factors for China wind power development

3.1 Policy and Market Development

- In 1994, the former Ministry of Electric Power issued a regulation, which required power authorities to give priority to wind-generated electricity.
- In 1999, the NDRC and the MOST issued an official notice(including a rule to set wind power pricing at a level that would repay capital cost with interest plus a reasonable profit).



3 Main factors for China wind power development

3.1 Policy and Market Development

- The Ride the Wind Program (initiated the localization of wind turbine manufacture)
- In 2002, the MOF and the SAT implemented a new tax policy that reduced the VAT for wind power generation from 17% to 8.5%.
- The former SETC implemented the National Debt Wind Power Program



3 Main factors for China wind power development

3.2 Wind Power Concessions

- The basic concept of the Wind Power Concession is that the local government will invite international and domestic investors to develop 100 MW level wind farms through a tendering procedure.
 - Technical feasibility
 - Tariff in phase I (equivalent 30,000h at rated output)



3 Main factors for China wind power development

3.2 Wind Power Concessions

- In October 2003, two companies were selected through competitive bidding to develop the first large-scale wind concession projects with the capacity of 100MW each.



3 Main factors for China wind power development

3.2 Wind Power Concessions

Project 1: Rudong wind farm, Jiangsu

- Huarui Group
- Tariff in phase 1 (including VAT), 0.4365RMB/kWh

■ Project 2: Huilai wind farm, Guangdong

- Yuedian Group
- Tariff in phase 1 (including VAT), 0.5013RMB/kWh



3 Main factors for China wind power development

3.2 Wind Power Concessions

- In September 2004, the developers for 3 wind concession projects with the total capacity of 400MW were selected through the competitive bidding procedure.



3 Main factors for China wind power development

3.2 Wind Power Concessions

Project 1: Rudong, Jiangsu

- Longyuan Group
- Tariff in phase 1 (including VAT), 0.5190RMB/kWh

■ Project 2: Tongyu, Jilin

- Longyuan and Huaneng Group
- Tariff in phase 1 (including VAT), 0.5090RMB/kWh

■ Project 3: Huiteng Xile, Inner Mongolia

- Beijing International Power Investment Corp.
- Tariff in phase 1 (including VAT), **0.3820**RMB/kWh



3 Main factors for China wind power development

3.2 Wind Power Concessions

- This year, 2 wind concession projects with the total capacity of 300MW will select the developers.

- Anxi, Gansu (100MW)
- Dongtai, Jiangsu(200MW)

Note: In the tendering document, there is no specification that the bidder with the lowest tariff in phase I will definitely be the winner.



3 Main factors for China wind power development

3.3 R&D Programs

- MOST funded the research projects to develop technologies for 600 kW WTGs during the 1996-2000.
- During the 2001-2005, MOST is supporting R&D programs to develop mega-watt-size wind turbines.

3 Main factors for China wind power development

- On April 24, 2005, the first direct driven 1.2MW wind turbines using PMSG is being erecting in Dabancheng wind farm, Xinjing AR, which is developed by Xinjiang Goldwind Corp.





3 Main factors for China wind power development

3.4 International Programs

- WB/GEF/GOC renewable energy strategic partnership program
- Sino-German Technical Cooperation Project —“Research and Training Centre”
- Sino-US Wind Technology Partnership program
- UNDP Capacity Building for the Rapid Commercialization of Renewable Energy project



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4 Barriers for further development of wind power

- Lack of detailed investigation of the national wind energy resource
 - Existing data is rough and insufficient
 - Detailed investigation is necessary
- Slow localization of wind turbines
 - The localization level of large size grid-connected wind turbine
 - Quality test and certification system for performance test of wind turbine



4 Barriers for further development of wind power

- Difficulty of integration wind farms into power grid
 - unfavorable impacts on power system operation; lack of knowledge about wind power generation and fear about “unpredictable” wind suppliers.
 - the feed-in price of wind power is higher than that of average level of conventional power plant
- Lack of sufficient qualified staff in wind power sector



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5 Suggested Areas for North-South Cooperation

- Wind turbine manufacture
 - establish Joint Ventures
 - the transfer of technology and know-how
 - establish the test and certification system
- Integration of wind farms
 - Help China to formulate the specifications and codes for integrating wind farms
 - Help grid corporations to operate and control the wind farm more flexibly



5 Suggested Areas for North-South Cooperation

- Investment and engineering consultancy
 - help the Chinese counterparts improve the appraisal capability at the preliminary stage of the projects
- Seminar and personnel training
 - Jointly implementing of seminar and personnel training.



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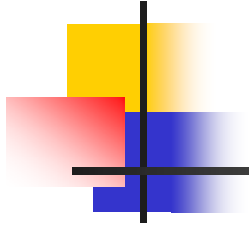
6 Conclusions

- China has proposed an ambitious target for wind power development. The total wind power capacity will reach 4GW and 20GW by 2010 and 2020, respectively.
- However, there are some barriers in the process of wind power development on a large scale.



6 Conclusions

- The Renewable Energy Law of P R China, which takes effect on the 1st of January 2006,
 - It will stimulate the development of the renewable energy industry in China significantly, especially wind power.
 - It will also provide a lot of opportunities for North-South cooperation in renewable energy sector.



Thank you!

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