



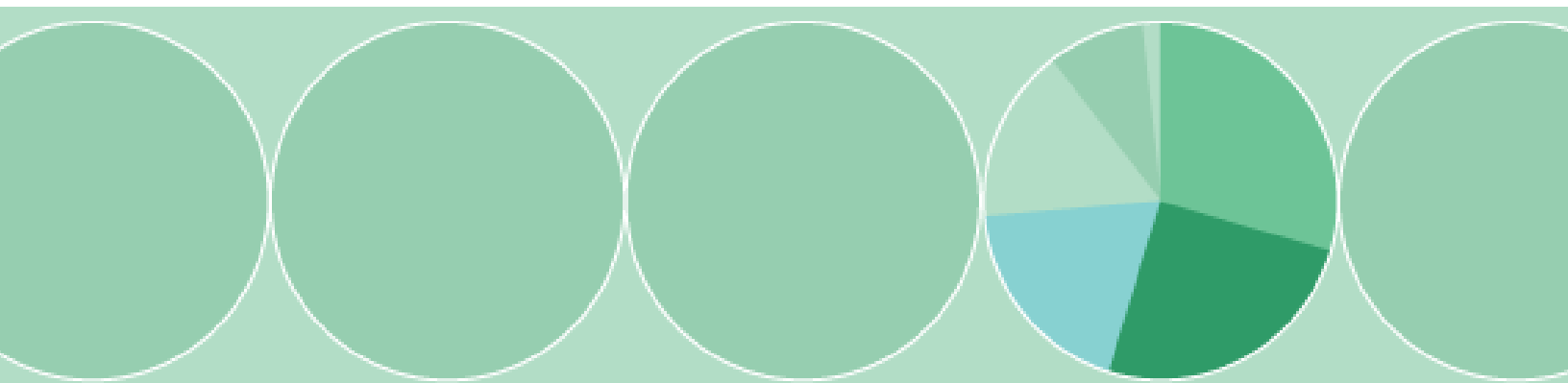
WHERE KNOWLEDGE IS POWER



IBISWorld and ACMR China Industry Report

09 July 2010

Alternative Power Generation in China: 4419

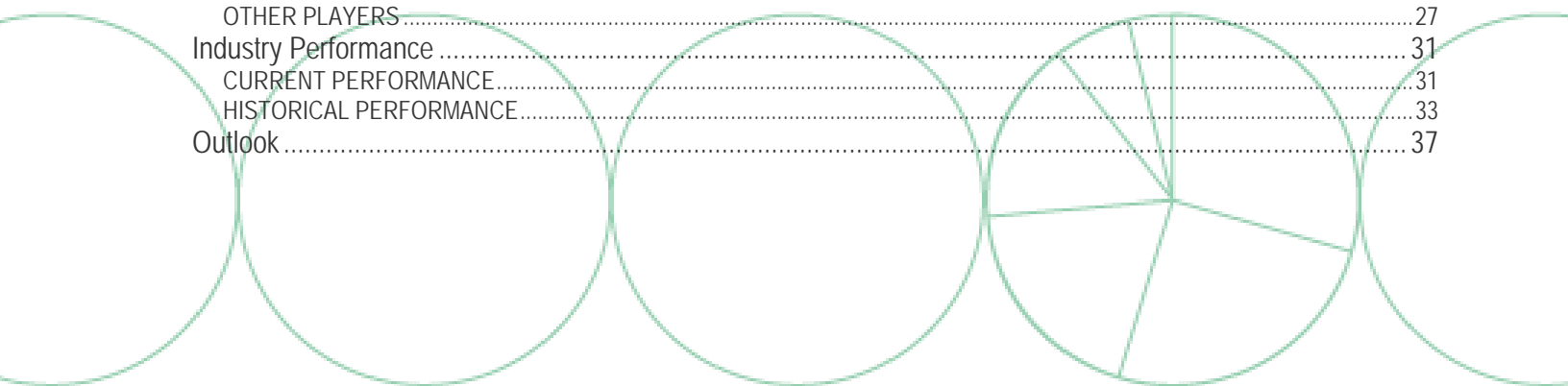


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Industry Definition

The Alternative Power Generation Industry in China (China Industry Code - 4419) comprises establishments primarily engaged in electricity generation with wind power, geothermal energy, solar energy, tidal energy and biomass energy, and other electricity generation activities that are excluded from thermal, hydraulic and nuclear electricity generation. Renewable energy includes new energies and hydraulic energies.

ACTIVITIES (PRODUCTS AND SERVICES)

The primary activities of this industry are:

- Electricity generation from refuse and biogas.
- Electricity generation with biomass energy.
- Electricity generation with tidal energy and other ocean energy.
- Electricity generation with wind power, geothermal energy and solar energy.
- Other electricity generation methods excluded from thermal, hydraulic and nuclear electricity generation.

The major products and services in this industry are:

- Wind power
- Refuse burning
- Other

SIMILAR INDUSTRIES

Industry:  4411 - Thermal Power Generation in China

Description: This industry comprises establishments primarily engaged in operating thermal power generation facilities.

Industry:  4412 - Hydroelectric Power Generation in China


Description: This industry comprises establishments primarily engaged in operating hydroelectric power generation facilities.


Industry:  4413 - Nuclear Electric Power Generation in China


Description: This industry comprises establishments primarily engaged in operating nuclear power generation facilities.


DEMAND & SUPPLY INDUSTRIES

 3661 - Electrical Equipment and Machinery Manufacturing in China

 3911 - Generator and Dynamo Manufacturing in China

 4420 - Electricity Transmission and Distribution in China

 C - Manufacturing in China

 I - Accommodation and Catering in China

Key Statistics

CONSTANT PRICES

	2006	2007	2008	2009	2010	
Industry Revenue	*1,182.3	*1,770.6	*2,717.0	*4,703.6	*6,045.6	\$Mill
Industry Gross Product	*507.2	*1,098.6	*1,422.9	*2,492.9	*3,234.4	\$Mill
Number of Establishments	*98	*142	*250	*297	*334	Units
Number of Enterprises	*91	*140	*245	*288	*320	Units
Employment	*8,053	*10,951	*18,919	*21,480	*23,542	Units
Exports	*1.1	*1.2	*1.3	*1.4	*1.3	\$Mill
Imports	*0.4	*0.4	*0.4	*0.4	*0.4	\$Mill
Total Wages	*43.6	*64.1	*99.6	*117.1	*133.2	\$Mill
Total Assets	*5,182.4	*7,936.7	*17,189.3	*24,583.2	*28,870.7	\$Mill
Domestic Demand	*1,181.6	*1,769.8	*2,716.1	*4,702.6	*6,044.7	\$Mill

CURRENT PRICES

	2006	2007	2008	2009	2010	
Industry Revenue	*926.6	*1,491.0	*2,452.7	*4,458.4	*6,045.6	\$Mill
Industry Gross Product	*397.5	*925.1	*1,284.5	*2,362.9	*3,234.4	\$Mill
Number of Establishments	*98	*142	*250	*297	*334	Units
Number of Enterprises	*91	*140	*245	*288	*320	Units
Employment	*8,053	*10,951	*18,919	*21,480	*23,542	Units
Exports	*0.9	*1.0	*1.2	*1.3	*1.3	\$Mill
Imports	*0.3	*0.3	*0.4	*0.4	*0.4	\$Mill
Total Wages	*34.2	*54.0	*89.9	*111.0	*133.2	\$Mill
Total Assets	*4,061.5	*6,683.5	*15,517.4	*23,301.6	*28,870.7	\$Mill
Domestic Demand	*926.0	*1,490.3	*2,451.9	*4,457.5	*6,044.7	\$Mill

REAL GROWTH

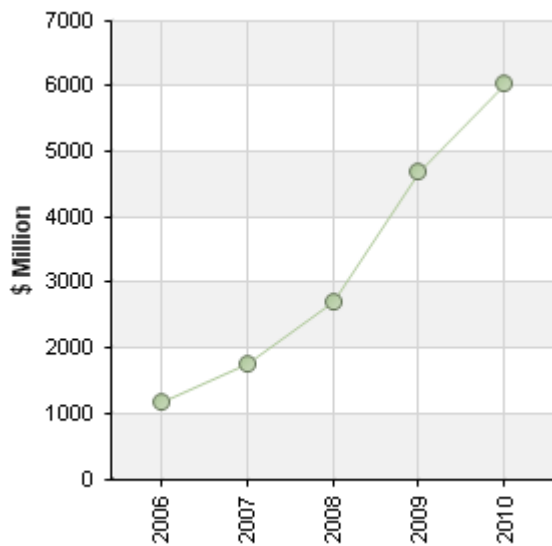
	2006	2007	2008	2009	2010
Industry Revenue	*170.7	*49.8	*53.5	*73.1	*28.5 %
Industry Gross Product	*85.2	*116.6	*29.5	*75.2	*29.7 %
Number of Establishments	*36.1	*44.9	*76.1	*18.8	*12.5 %
Number of Enterprises	*42.2	*53.8	*75.0	*17.6	*11.1 %
Employment	*49.3	*36.0	*72.8	*13.5	*9.6 %
Exports	*22.2	*9.1	*8.3	*7.7	*-7.1 %
Imports	*33.3	*0.0	*0.0	*0.0	*0.0 %
Total Wages	*76.5	*47.0	*55.4	*17.6	*13.7 %
Total Assets	*73.0	*53.1	*116.6	*43.0	*17.4 %
Domestic Demand	NC	*49.8	*53.5	*73.1	*28.5 %

RATIO TABLE

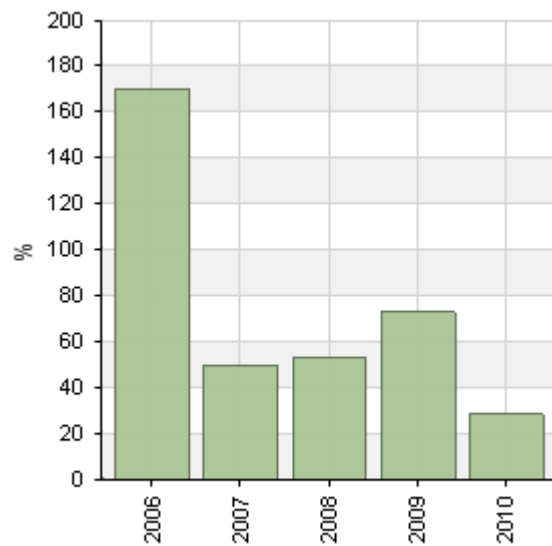
	2006	2007	2008	2009	2010
Imports share of domestic demand	*0.03	*0.02	*0.01	*0.01	*0.01 %
Exports Share of Revenue	*0.09	*0.07	*0.05	*0.03	*0.02 %
Average Revenue per Employee	*0.15	*0.16	*0.14	*0.22	*0.26 \$Mill
Wages and Salaries Share of Revenue	*3.69	*3.62	*3.67	*2.49	*2.20 %

GRAPHS

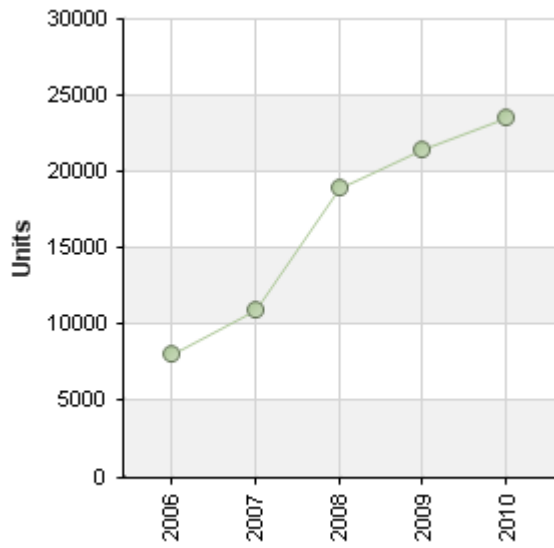
Revenue



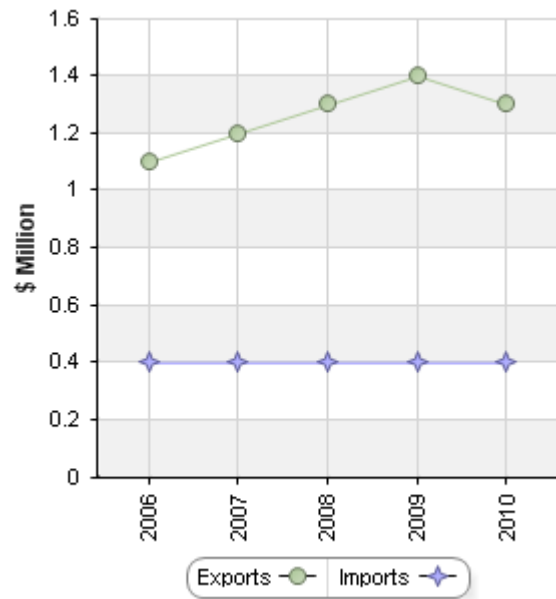
Revenue Growth Rate



Employment



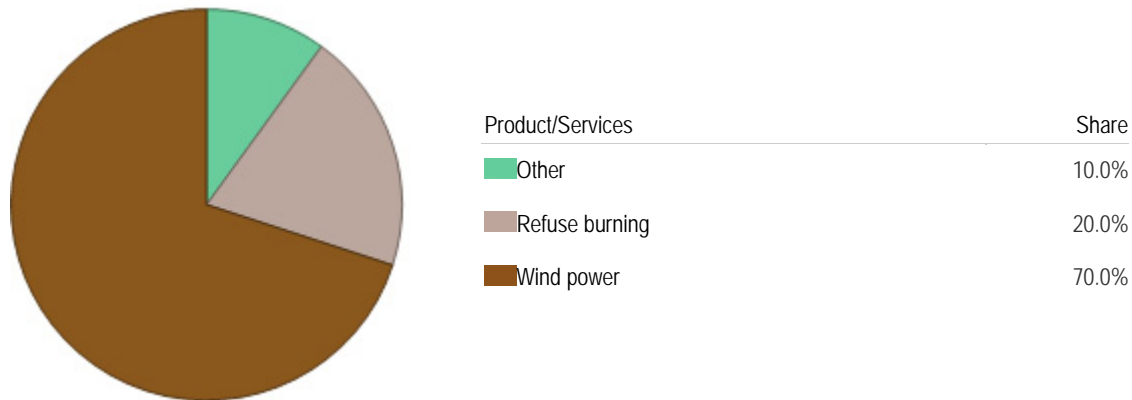
Imports and Exports



Note: Unless specified, an asterisk (*) associated with a number in a table indicates an IBISWorld estimate and references to dollars are to US dollars.

Segmentation

PRODUCTS AND SERVICE SEGMENTATION



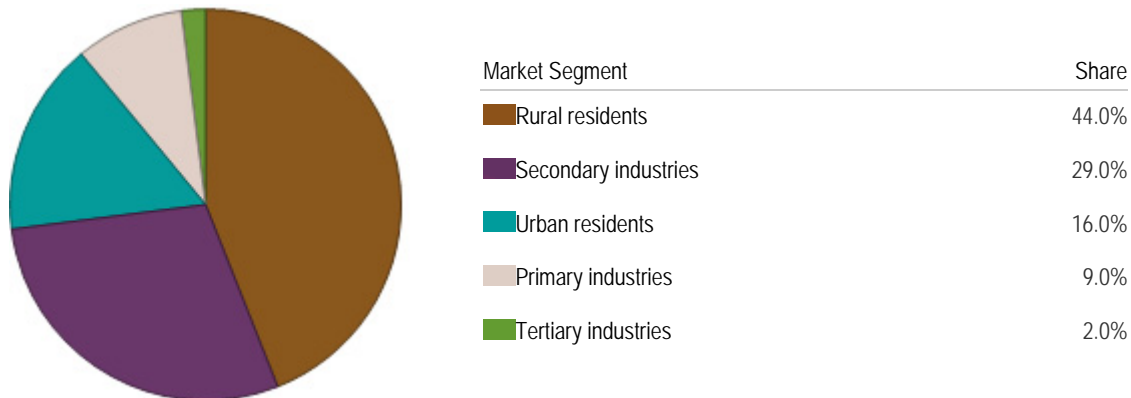
The proportion of different generation methods is estimated according to the data and information of the China Electric Power Yearbook in 2009.

Wind power generation is the dominant method in the Alternative Power Generation Industry. China has abundant wind power resources of about 253 million kW on land. In addition, wind power plants are relatively easier to set up, and require smaller initial investments than other new energy plants. Since 2007, wind power generation construction in China has increased significantly and, by the end of 2009, the installed capacity of wind power generation had reached 28.5 GW. Wind power generation companies are expected to generate about 70% of industry revenue in 2010.

Refuse burning is forecast to account for about 20% of industry revenue in 2010. In recent years, many of China's cities have expanded so rapidly that suitable land for refuse disposal is scarce. Power generation from refuse burning has become a solution for reducing refuse while enhancing power supply. Refuse mainly includes refuse from residents, attle or coal gangues (Chinese name: Ganshi) that contain low coal content, and gas (usually methane) emerging from coal mines. The proportion of industry revenue from refuse burning is expected to increase in future years as the plants can be built close to coal mines or cities that consume high electricity volumes, while refuse burning also helps to reduce refuse levels.

Other electricity generation methods, such as tidal and geothermal, require specific geographic environments, while solar energy plants require high initial purchase costs. These have limitations and are still relatively small in scale.

MAJOR MARKET SEGMENTS



Market shares are estimated according to the geographic spread of new energy plants and the overall electricity consumption data from the China Electric Power Yearbook.

Rural residents are the major consumers of new energy generated electricity. Since most wind power plants are located in windy rural areas, and a large proportion of solar energy plant capacity is installed in Tibet to supply remote areas with electricity, rural residents account for an estimated 44% share of industry revenue in 2010.

Secondary industries are forecast to account for 29% of industry revenue in 2010. Secondary industries are the largest electricity consumers as they include manufacturing industries. Due to the locations of new energy plants, new-energy generated electricity has to join regional or provincial electricity grids to supply these industries. Therefore, the share of secondary industries is lower than that of rural residents.

Since solar energy plants and geothermal plant in West China, and wind power plants in east coastal areas supply electricity to nearby cities, urban residents are estimated to account for 16% of industry revenue in 2010.

Primary and tertiary industries generally consume small levels of electricity relative to manufacturing industries and households. Therefore, their share of alternative energy consumption is small.

INDUSTRY CONCENTRATION

The level of industry concentration is low

The industry concentration level is low, with the top four enterprises accounting for an estimated 7% of total industry revenue in 2010.

This industry is heavily related to the geographic environment. For example, wind farms or plants must be built in locations where wind resources are sufficient, geothermal plants can only be built on geothermal sites. Therefore, companies in this industry are largely decentralized.

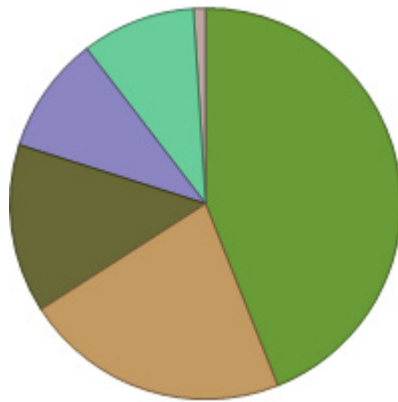
The industry is now in an early stage of its development. Competition between firms is low and the development of each company is independent from others. Firms do not generally need to merge for improved development prospects, but can benefit from economies of scale.

This industry is under strong regulation from the government and projects have to be approved by local governments. Therefore, the development of companies is heavily controlled.

GEOGRAPHIC SPREAD

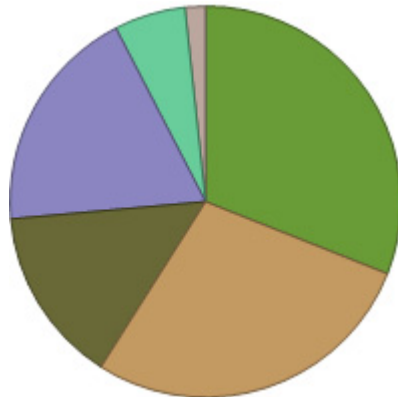
Year: 2010

Geographic Spread of Employment



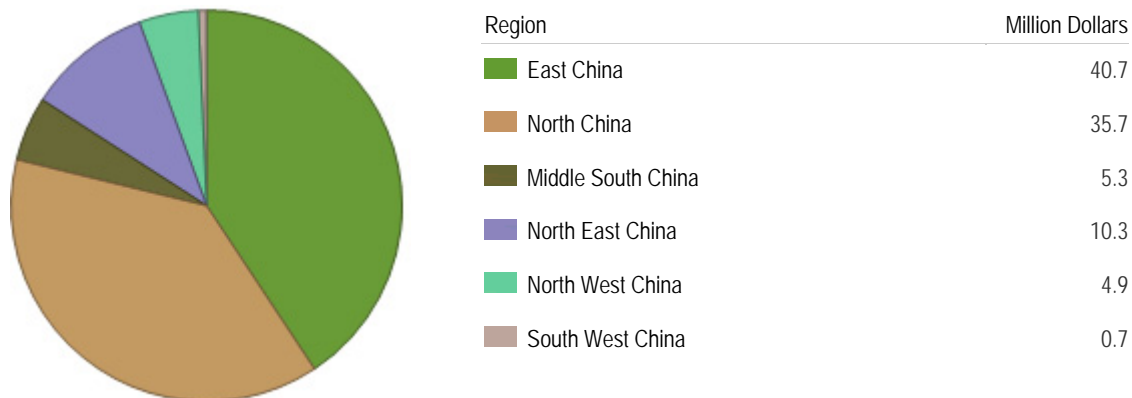
Region	Million Dollars
East China	43.9
North China	20.1
Middle South China	13.9
North East China	9.7
North West China	9.4
South West China	1.0

Geographic Spread of Enterprises



Region	Million Dollars
East China	31.0
North China	26.3
Middle South China	14.6
North East China	18.8
North West China	5.9
South West China	1.7

Geographic Spread of Revenue



Inner Mongolia is expected to account for 27.1%, 12.4% and 17.0% of total industry revenue, industry employment and enterprises in 2010, respectively. By the end of October 2009, the total installed capacity of wind power in Inner Mongolia totaled 5.03 million KW, the highest in China. The total wind energy storage is about 898 million KW, accounting for about 21.4% of total reserves in China. The technically exploitable capacity of Inner Mongolia is around 150 million KW, accounting for 50% of China's total. In recent years, with the government assistance and guidance, Inner Mongolia has increased its wind energy development. Many power enterprises and groups, such as the State Power and China Power Investment Corporation, have invested in wind power construction in Inner Mongolia. Inner Mongolia is also the second-largest user of solar energy in China.

With an estimated 21% of total industry employment and 9.4% of total enterprises, Shandong province is expected to make up of 23.4% of industry revenue in 2010. The wind energy storage in Shandong province is the third-highest in China, with a capacity of 88,000,000 KW, accounting for 8.8% of China's total capacity. According to the Shandong Electric Power Engineering Consulting Institute, the number of wind farms in the province is 38, including 13 in Yantai. In addition, Shandong province has 3,100 kilometers of coastline and its offshore wind energy storage is increasing. Huaneng Group, Huadian Power International and State Power have invested actively in wind power construction in Shandong province.

In Jiangsu province, industry revenue is expected to account for 8% of total industry revenue in 2010. With an estimated 8.9% of total industry employment, Shandong province is forecast to have 8% of total industry enterprises. Jiangsu province is one of seven wind power bases in China. Since 2008, the wind power segment in Jiangsu province developed rapidly. Jiangsu province has 60 million KW of wind power resources. Wind power enterprises in Jiangsu province are mainly concentrated in Nanjing, Changzhou, Wuxi, Nantong and Yancheng. By the end of 2010, the installed wind energy capacity of Jiangsu province is expected to total 1.5 million KW. In addition, Jiangsu province is one of the cities developing photovoltaic housetop electricity generation projects in recent years.

There are several other provinces developing in the Alternative Power Generation Industry. For example, Hebei province and Liaoning province are expected to account for 4.8% and 4.2% of total industry revenue, respectively, in 2010.

Market Characteristics

MARKET SIZE

Electricity demand in China has been rapidly increasing since 2001, exceeding the national supply capacity in 2003 and 2004, and causing power interruptions when demand peaked. Since the electricity produced by the Alternative Power Generation Industry in China was small in scale, the electricity supply shortage in those years triggered an increase in the development of this industry.


Government assistance to this industry has been high. In the five-year period to 2010, the wind power generation segment developed rapidly, with the Ministry of Finance and the State Administration of Taxation reducing the VAT (Value-Added Tax) rate from 17% to 8.5% for wind power generated electricity in that year.

The Kyoto Protocol also stimulates new energy development in China through CDMs (Clean Development Mechanisms). Since its implementation in February 2005, developed countries started investing in new energy projects in developing countries in exchange for CERs (Certified Emission Reductions). Therefore, as a major developing country, China absorbs large quantities of investment for new energy projects, which results in the acceleration of this industry's growth.

Industry revenue is expected to increase at an annualized rate of 69.1% in the five years to 2010, with strong government support and increased awareness amongst households and businesses of alternative energy options. This very strong growth saw industry revenue increase from just \$436.8 million in 2005 to a forecast \$6.05 billion in 2010 (constant 2010 dollars).

LINKAGES

Demand Linkages

 C - Manufacturing in China

Manufacturing industries are the major consumers of electricity.

 4420 - Electricity Transmission and Distribution in China

This industry distributes electricity to end-users.

 I - Accommodation and Catering in China

Important consumers of electricity.

Supply Linkages

 3661 - Electrical Equipment and Machinery Manufacturing in China

This industry supplies electrical equipment and machinery used by power generation plants.

 3911 - Generator and Dynamo Manufacturing in China

This industry supplies generators for power generation plants.

DEMAND DETERMINANTS

Demand factors for services from the Alternative Power Generation Industry in China show that government policies play a key role in the industry's development. China has placed a priority on new energy projects as part of its sustainable development strategy to reduce pollution in the future. The future will see more substantial efforts from the government to develop new energy as clean sources of energy.

China's strong economic growth is also a major demand determinant as the energy sector in general is very closely linked to overall economic development and growth. Stable political direction and the government's desire to strongly develop and promote the Chinese economy can promote the industry's development in the long term.

New energy plants are immune to price increases of fossil fuels such as oil, natural gas or coal. Solar and wind power plants require less maintenance than other power plants. Labor costs also tend to be low since plants are generally automated and require few operators on site during normal operations.

Increasing income levels and purchasing power of the average Chinese person contributes to stronger demand for electronic products, such as televisions, refrigerators and air-conditioners, which in turn increases the total electricity consumption level. The proportion of residential electricity consumption in total has shown an increasing trend in recent years.

Rural households in remote regions that are not serviced by electricity grids rely on electricity generated by new energy plants, especially where hydroelectric power is insufficient to drive small hydropower plants.

DOMESTIC AND INTERNATIONAL MARKETS

Domestic and International Markets Exports

The level of trade export is low

The trend of trade export is steady

Domestic and International Markets Imports

The level of trade import is low

The trend of trade import is steady

Domestic and International Markets Analysis

Since the product of this industry is electricity, the generation method cannot be identified once the electricity is transmitted into regional electricity grids. Therefore, the import and export values of electricity are estimated according to the total value and the ratio of generated power quantity according to the China Electric Power Yearbook and the National Bureau of Statistics.

Imports are expected to represent less than 0.01% of domestic demand for the industry's electricity in 2010, almost the same as in 2008. About 94% of the imported electricity is from Hong Kong. Other import sources include Russia and North Korea.

Exports are estimated to account for 0.05% of industry revenue in 2010, marginally down from 0.06% in 2009. Approximately 84% of electricity is exported to Hong Kong. Macau and Vietnam are two other large export destinations, accounting for about 10% and 5% of the export value, respectively.

The trading of electricity between mainland China and Hong Kong is important for adjusting the supply for periods of peak demand in Hong Kong and Shenzhen, and sometimes the entire Guangdong Province.

BASIS OF COMPETITION

Competition in this industry is low

Competition in this industry is increasing

Internal Competition

Competition in the electricity sector in China, including hydropower generation, was introduced at a particularly late stage, as the sector has historically been controlled by the Chinese Government. In addition, China experienced major problems with capacity shortages, and was often unable to meet surging demand.

Within the Alternative Power Generation Industry in China, competition is currently low. The industry is prioritized and protected by the government, and the scale of it is still small. Many players still receive high support levels from the government, in terms of favorable taxation policies, support via low interest loans, subsidies, and lower taxes. However, growth in establishment numbers and intensified investment activities will initiate competition.

Land and location are important competition factors in this industry. Competition starts even before entering the industry, when enterprises compete for land with abundant new energy resources. Only a limited number of companies (usually domestic) are able to get approval for new energy projects.

Relationships with local governments are important for acquiring the land for power plants. Capital availability is also essential for this industry given the high capital intensity and generally long investment cycle for the construction of a power plant.

Electricity producers in China are unable to compete against each other based on price as this is determined by the government. Prices can vary across different regions, but usually not within a region.

External Competition

Thermal Power Generation - New energy power plants face competition from establishments within the Thermal Power Generation Industry, as they currently are the main electricity providers. However, competition is limited as new energy is cleaner and less dependent on fuel supplies.

Hydroelectric Generation - Hydroelectric power plants produce electricity with larger capacities and with low pollution. The Hydroelectric Power Generation Industry in China has a longer history and has a more mature technology level. However, hydroelectric plants are limited to areas with water resources, while new energy plants, especially wind and solar plants, can be deployed in different geographic environments.

Competition from the Nuclear Electricity Power Generation Industry is weak as nuclear plants in China are only located in Zhejiang and Guangdong provinces to fulfill electricity demand from large cities and surrounding regions.

LIFE CYCLE

Life Cycle Stage

The life cycle stage is growth

Life Cycle Reasons

- This industry is small in scale, but is growing rapidly
- Very high industry revenue and value added growth in recent years
- New technologies for new energy generation are entering China
- Large portions of new energy resources are under-developed
- Government policies are encouraging the industry's development

Life Cycle Analysis

This industry is small in scale as there is only expected to be 320 firms operating in the industry in 2010, which are forecast to employ around 23,500 workers. However, it is a rapidly growing industry, generating a forecast \$6.05 billion in revenue in 2010, with annualized increases of 69.1% in the past five years (constant 2010 dollars).

The technologies for new energy generation are being imported with the help of government policies. Also, equipment manufacturers in China are researching and developing inexpensive and high-technology solutions for domestic new energy plants.

Only small percentages of new energy resources in China are currently developed. For example, among the industry's firms in 2008 only 26 were engaged in household waste burning generation, which were located in 14 cities, while there were 661 cities in China, and 51 of them had populations of over 1 million. The exploitable wind power resource is 253 GW (giga-Watts), while the installed capacity of all wind plants in China in 2008 was 12.15 GW.

Through the Renewable Energy Law and the Energy Law, the government will release policies and strategies to encourage the development of new energy generation in the future.

Industry Conditions

BARRIERS TO ENTRY

Barriers to entry in this industry are high
These barriers are decreasing

High levels of capital are essential for new firms to enter the industry due to the high capital intensity and relatively long investment cycle of construction. Moreover, the industry's construction projects need to be approved by the government. These, however, are now easier, as the government is encouraging new players to enter the industry. There are a wide range of government policies and conditions that are required to be satisfied before a new company can enter this industry.

Technologies are required to operate and repair generators. Especially for wind power plants, skilled technicians are necessary since the equipment is foreign-made or contains imported technologies. Refuse burning enterprises also need experts to improve equipment efficiency and reduce pollution.

In addition, favorable taxation policies for the development of this industry combined with other deregulation measures will help to lower many of the traditional barriers to entry. At the same time, the growth of domestic new-energy equipment manufacturers will lower the cost to operate in this industry, which will also lower the barriers to entry.

TAXATION

Taxation policies vary for new energy plants depending on their method, size, region and ownership. Since the mid-1990s the development of new energy plants has been encouraged in rural areas in most central and western provinces in China. Foreign investment is also encouraged in the field of renewable energies projects, with policies being implemented since 2006.

Income Tax is imposed on adjusted profit of a company, with the rate at 25%. This new taxation rate came into effect on January 1, 2008, from the double-track system for domestic and foreign companies. However, there will be a five-year transition period for foreign-invested companies during which they benefit from lower income tax rates at a minimum of 17%.

Since 1994, new energy plants have enjoyed a favorable VAT rate (value-added tax) of 8.5%. In some regions, no tax is required on new energy plants during the first two years of operation, and in the following three years a certain amount of tax can be deducted. In other areas the tax is levied first, and then one part or even all returned for further investment. In Hunan province a certain amount of tax can be deducted before getting back all construction costs.

Taxation policies for foreign investment in renewable energy include: (1) Lower VAT from 17% to 8.5%; (2) Low (15%) foreign investment enterprise income tax rate; (3) Extension of foreign investment enterprise "production-oriented" holidays from income tax due to "advanced technology" status; and, (4) Exemption of foreign enterprise withholding tax (normally 10% of gross) for cross-border technical fees.

INDUSTRY ASSISTANCE

The level of Industry Assistance is high
 The trend of Industry Assistance is increasing

Key Tariffs

Goods	Low Rate*	High Rate*
Electricity	0.0	8.0

*Percentage of value unless otherwise specified

The Alternative Power Generation Industry in China is highly assisted by the government including the provision of favorable taxation policies, assistance for policies for low interest loans from domestic commercial banks, support for overall planning and management of new energy resources, simplified procedures for project approval and land-use applications, and favorable policies on off-take quantity and electricity prices after integration with the power grid (although these vary by project size and regions).

The State Development Bank has used its government banking and high credit ratings to raise funds for new energy projects in international bond and loan markets. The bank was founded in 1994 to overcome the limits faced by domestic banks in high-capital-cost, long-term project lending.

Additional support provided by the government is the "National Debt Wind Power Project", which uses special national debt to offer loans in order to help importing wind turbine manufacturing techniques, along with the purchase of wind turbines.

In July 2007, State Electricity Regulatory Commission released a method on regulating purchasing electricity generated by renewable energy. In September 2007, State Electricity Regulatory Commission and State Development and Reform Commission released a notice on subsidizing electricity generated by renewable energy for 2006, which indicated the official implementation of subsidizing electricity generated by renewable energy.

REGULATION AND DEREGULATION

The level of Regulation is heavy
 The trend of Regulation is increasing

Institutional Framework

In general, establishments within the power sector, including new energy generation, are subject to regulations by the State Electricity Regulatory Commission (SERC). Activities within the Alternative Power Generation Industry are also subject to all regulations concerning renewable energy issued by the relevant governmental institutions. These include:

The State Economic and Trade Commission (SETC) oversees industrialization and the retrofitting of existing industries. Under the Department of Resource Conservation and Comprehensive Utilization, the Renewable Energy Division and the Energy and Material Saving Division takes the lead in direct support for renewable energy development. Since 1998 the SETC has also been tasked with regulating the electricity sector. In this regard, the Department of Electric Power develops policies and regulations, while the Department of Legal Affairs manages legislation and enforcement.

The State Development and Reform Commission (SDRC) is responsible for macro-planning and budget approval. Renewable energy development is regulated by the Division of Energy Efficiency and Renewable Energy, under the Department of Basic Industries. In addition, the Department of Product Pricing and Management is responsible for approving electricity prices. SDRC also approves financing and foreign exchange requirements for new renewable energy projects.

The Ministry of Science and Technology (MOST) is in charge of the administration of scientific research and development (R&D) projects, technology transfer, including the acquisition of foreign technology. It supports manufacturing activities through the provision of venture capital.

The State Power Corporation of China (SPCC) was created from the then Ministry of Electric Power in 1998 as a step toward reforms in the power sector. By this time SPCC and its subsidiaries owned around 90% of the national generation capacity and administered all grid-connected transmission and distribution facilities. SPCC remains involved in policy formulation and is responsible for the co-ordination of resource assessments.

The State Environmental Protection Administration (SEPA) is responsible for all aspects of environmental policies, the formulation of the national environmental regulations and the issuing of national environmental quality standards. SEPA is entrusted by the State Council for the enforcement of the regulations and standards and co-ordination of the important environmental programs and projects, including renewable energy projects.

Other governmental institutions that contribute to renewable energy development in their particular fields of operation are: Ministry of Finance (budgetary affairs); Ministry of Forestry (off-grid electrification); Ministry of Foreign Trade and Economic Cooperation (development assistance); Ministry of Construction (energy use and integrated construction); and, Office of Poverty Alleviation and Development (rural electrification).

Regulations

The Renewable Energy Law was listed in the national legislation plan in June 2003 and issued by the Chinese People's Congress and the President of China in February 2005. It became effective on January 1 2006. Its main purpose is to promote the development and utilization of renewable energy, improve the energy structure, diversify energy supplies, safeguard energy security, protect the environment, and realize the sustainable development of the economy and society.

Renewable energy in this law refers to non-fossil fuel energy, such as wind energy, solar energy, water-related energy, biomass energy, geothermal energy, and ocean energy.

The main provision of this law is the encouragement of economic entities of all types of ownership to participate in the development and utilization of renewable energy and the protection of the legal rights and interests of the developers and users of renewable energy on the basis of law.

It has established targets for consumption of renewable energy to reach 15% of the total by 2020. This strategy will have an impact on the industry's development and structure, stimulating the development of new energy plants. China pledged to increase its installed renewable energy generating capacity to about 60 GW (giga-Watts) by 2010, about 10% of total power capacity. The amount of renewable energy it currently generates is less than 1% of the total.

Application of this law for those involved in this industry is regulated by the energy authorities of the State Council and approved by the State Council. Energy authorities of the State Council implement management for the development and utilization of renewable energy at the national level. Relevant departments of the State Council are responsible for the management of relevant development and utilization of renewable energy within their authorities.

Energy authorities of local governments above the county level are responsible for the management of the development and utilization of renewable energy within their own jurisdiction. Relevant departments of local people's governments above the county level are responsible for the management of relevant development and utilization of renewable energy within their authorities.

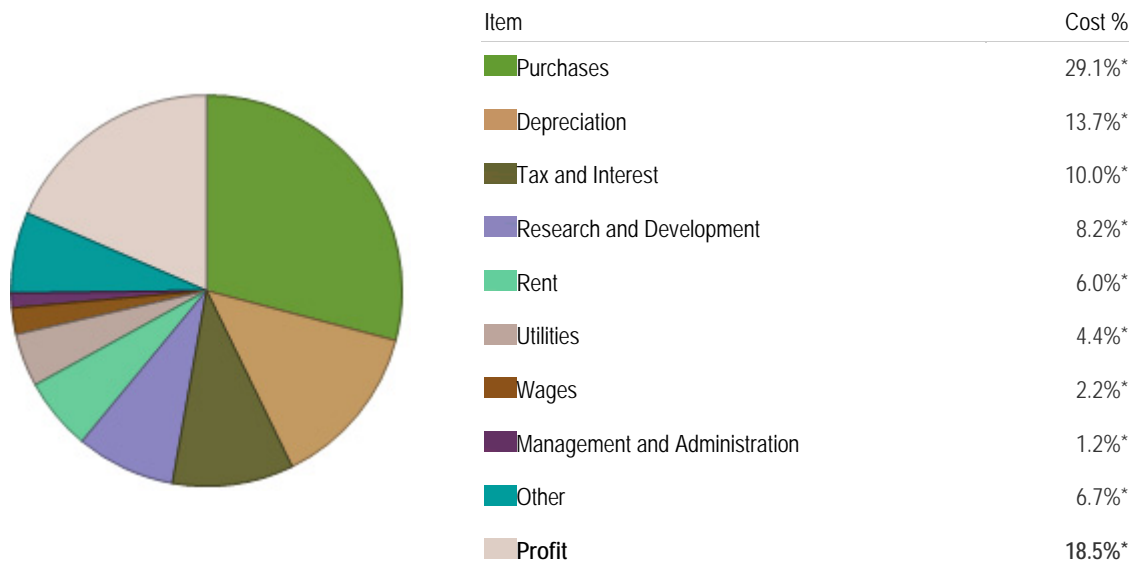
In 2007, SPRC released Middle- and Long-term Development Plan for Renewable Energy. This plan determines that by 2010 and 2020, the electricity in the main grid generated by renewable energy except hydraulic power should reach 1% and 3% of total generation, respectively.

Other favorable policies for new energy plants which vary between different regions and cases are: (1) Banks offering support or convenience when granting loans; (2) Government support for overall planning and management of new energy resources; (3) Simplified procedures for project approval and land-use applications; and, (4) Favorable policies on off-take quantity and electricity prices when plants are integrated with a power grid.

Regulation to this industry will intensify in the future as China is planning for more provisions to ensure the quality of electricity, level of environmental protection, and the ratio of Chinese-made equipment to foreign-made equipment.

COST STRUCTURE

Year: 2010



Profits are expected to make up 18.5% of total industry revenue in 2010. This proportion is expected to rise in future years as the government will release more strategies to help develop new energy plants.

Depreciation is a major cost incurred by the plants in this industry, absorbing a forecast 13.7% of total industry revenue in 2010. This includes depreciation on fixed assets and equipment (including special equipment, electrical equipment, transporting equipment, and other equipment). The proportion of depreciation in different generation methods varies. However, in general it has been increasing in recent years due to the purchase of more advanced equipment.

Tax and interest fees account for a relatively large percentage of industry revenue at a forecast 10% in 2010. The initial investment cost associated with plant construction is high in the early years, reflecting the need for bank loans, which are required to be repaid with interest. Once the loans are repaid, this proportion of interest costs drops dramatically as only operational and maintenance costs are then required to be paid.

Labor costs tend to be low since plants are generally heavily automated and have few personnel on site during normal operations. Wages are forecast to account for 2.2% of industry revenue in 2010, with this share having decreased in recent years as employment numbers increase at a slower rate than industry revenue growth.

Research and development fees are forecast to make up about 8.2% of industry revenue in 2010. The amount of these fees varies across different generation methods. Refuse burning enterprises require large investment levels to research more energy-efficient and environmentally-friendly processing techniques, while wind power enterprises only have to invest for geographic research, given that turbine technologies are developed by turbine manufacturers.

Other costs include initial project costs, operating costs, maintenance costs and investments for upgrades and expansion. Maintenance costs are expected to decline in the future since the government requires the industry's participants to reach a certain level of Chinese-made equipment levels. However, the industry's development will continue to accelerate, with costs for upgrades and expansion increasing rapidly.

CAPITAL AND LABOR INTENSITY

The level of Capital Intensity is high

- Power generation is a highly automated process and does not require many employees
- This industry relies heavily on plant and equipment to generate revenue

Electricity generation in this industry involves the production of electricity through conversion of wind, solar, geothermal and other sources of renewable energy. It is a capital-intensive process, and the efficiency with which capital is employed has a major influence on the cost of electricity generation.

The process of power generation is highly automated. Employees needed are maintenance workers, and transportation workers in refuse burning plants.

The industry's capital intensity level will increase in the future as the scale of new energy plants continues to increase, and the equipment becomes more technologically-intensive.

TECHNOLOGY AND SYSTEMS

The level of Technology Change is high

Wind Power

Traditional wind turbines are installed on 10-meter-tall bases and are driven by wind in fixed horizontal direction. In order to generate constant electrical currents from varying wind speeds, the turbines are attached to complicated gear boxes to

adjust for different revolutions. These generators stop when the wind speed is higher or lower than the designed range of the gear boxes.

In recent years, the technology of wind power generators has changed only slightly. Compared to traditional wind generators, modern ones cancel the gear boxes, and use adjustable computer-controlled blades instead. When the wind speed changes, the computer within the generator adjusts the position of blades to maintain constant rotation speeds of the blades. The removal of gear boxes reduces the noise when operating, and increases the adaptability of the generators.

Traditional horizontal-axis wind power generators can only operate in fixed-direction wind. In contrast, vertical-axis generators can operate regardless of wind direction, which makes these generators popular in seasonal wind regions. However, vertical-axis generators are still of low capacity, and due to the patent cost, they are currently deployed on a small scale.

Since domestic manufacturers of wind power equipment have insufficient design skills, fully-domestically-made equipment only makes up a small proportion in China. In 2005, over 70% of the equipment in the market was foreign-made, and in 2008 this ratio dropped to 55%. This situation is changing due to the government's requirements that the industry's participants should have Chinese-made equipment of a certain level.

Solar Energy

The core material of solar cells is silicon. However, Chinese manufacturers lack the technologies to produce silicon crystals that are suitable for solar cells. Chinese solar cell manufacturers have to import silicon crystals from developed countries, causing higher prices of solar cells and consequently the high costs to build solar plants.

Refuse Burning

With a long history of developing coal-burning generator sets, China has sufficient technologies to manufacture Chinese-made refuse burning furnaces and generator sets. Refuse burning equipment in China utilizes dust retrieving technology, heat recycling designs, and heat-electricity co-generation equipment from the Thermal Generation Industry.

INDUSTRY VOLATILITY

The level of volatility is very high

The industry experienced rapid growth in domestic electricity demand in recent years. The industry scale is small. As the industry is developing from a low base, changes in industry growth are magnified. Government assistance has contributed to significant changes in industry revenue in recent years and will continue to do so in the future.

Domestic technologies for new energy plants are relatively limited, but are being developed by local companies. technologies are also imported. As the industry's capacity increases, and as industry revenue growth continues to increase strongly from its current low base, industry revenue volatility will moderate in future years.

GLOBALIZATION

The level of Globalization is low

The trend of Globalization is increasing

This industry has a low globalization level. Foreign-owned enterprise revenue accounts for about 26.1% of industry revenue, while imports and exports are very low compared with the industry's revenue. ACMR-IBISWorld forecasts that imports will account for less than 0.01% of domestic demand in 2010, while exports will account for 0.05% of industry revenue for the year.

Electric power generation is important to a country and, therefore, the government keeps the electric power generation sector under strong control. In the Alternative Power Generation Industry, only a few enterprises are foreign-funded. Other enterprises are private, or invested by state-owned electric power enterprises.

The Alternative Power Generation Industry in China is a technology-intensive industry. The technologies required by this industry are not mature in China, and therefore China has had to import the generators or the technologies from developed countries. However, China focuses on developing domestic technologies and domestic-made generators to reduce costs and accelerate the development of new energy.

Enterprise Ownership Type - 2009

Ownership Type	Percentage Revenue Share	Percentage Enterprises Number Share
State-owned	15.1	20.1
Collectively-owned	0.4	0.4
JECE	0.4	1.4
Shareholding	6.1	5.9
Private	19.3	13.2
Foreign	26.1	27.4
Other	32.6	31.6

Source: National Bureau of Statistics China

Note: JECE is short for "joint-equity cooperative enterprise"

Key Factors

KEY SENSITIVITIES

The key sensitivities affecting the performance of the Alternative Power Generation industry include:

Competition from Substitutes - Thermal Power Generation - Hydro Power Generation

Competition from less expensive, prior alternatives, such as thermal power generation will still be the main challenge to new energy plants in the near future. These industries are developed in large scale and considered as the main electricity providing industries.

Industry Systems and Technology - Electrical Equipment and Appliance mfg

The price of equipment for this industry is essential for companies to initiate operations. Domestic equipment with advanced technologies is helpful to accelerate the development of the industry.

Infrastructure - Electricity Distribution Network

The electricity distribution network is currently not very well developed in China and this limits the development of the industry. The establishment of a complete nation-wide electricity distribution network is important.

Level of Protectionist Policies - Local Government

After the tight government control of the power sector was decentralized to encourage local investment, geographic units of central planning became fragmented regional markets. These are protected by local governments that are charged with the responsibility of economic operations within their jurisdictions.

Rural Population - No. people in Rural Areas

The large proportion of China's population living in rural areas has a positive impact on the development of new energy plants whose main markets are located in rural areas. This is because there is very limited power supply to the rural and remote regions in China given they are unable to be reached easily by the current power grids.

KEY SUCCESS FACTORS

The key success factors in the Alternative Power Generation industry are:

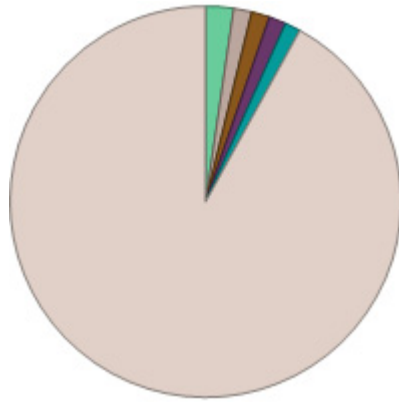
- Ability to negotiate successfully with regulator
Ability to negotiate with local governments is important to gain access to new energy resources.
- Optimum capacity utilisation
Higher capacity utilization is generally associated with lower unit costs.
- Ability to attract local support/patronage
Important for sales of electricity, as each province takes a fraction of market demand and selects a certain number of power producers to participate in supplying electricity.

- Ability to take advantage of government subsidies and other grants
Subsidies are important for the construction of new energy projects.
- Superior financial management and debt management
The level of borrowing and interest rates has a major impact on the profitability of a firm, as well as on the investment in new capacity construction or expansion.

Key Competitors

MAJOR PLAYERS

Market Share



Major Player	Market Share Range
Shandong Ganshi Electric Power Co., Ltd.	2.3% (2010)
Shandong Luneng Rongcheng Wind Power Co., Ltd.	1.5% (2010)
Yingkou Wind Power Co., Ltd.	1.5% (2010)
Qingdao Huawei Wind Power Co., Ltd.	1.4% (2010)
China Datang Corporation	1.3% (2010)
Other	92.0% (2010)

PLAYER PERFORMANCE

Shandong Ganshi Electric Power Co., Ltd.

Market Share: 2.3%

Shandong Ganshi Electric Power Co., Ltd. (SGEP) was established in October 1998. Its installed capacity is 48 MW, and to June 2005, it had generated 2.05 billion KWh and supplied the grid with 1.85 billion KWh. Ganshi is the Chinese name of the rocks that are excavated through coal mining but contain low coal content. Traditionally, ganshi was discarded and piled up near coal mines. However, ganshi piles were subject to frequent landslides and spontaneous fires, as well as water and air pollution. The environment around was then severely damaged.

Shandong Ganshi Electric Power Co., Ltd. was established in the county of Xintai where coal mines are abundant, giving the company the advantage of sufficient ganshi supplies. Besides this, SGEP also concentrates on applying technologies that can reduce pollution and energy consumption of the plant. For example, the ashes after burning are mixed with ganshi and burnt in furnaces for a second time, which can fully burn the coal in the ashes. The final ashes are then processed into raw materials for cement, bricks and chemical fertilizer. Shandong Ganshi Electric Power Co., Ltd. also invested in automation and water recycling to increase the efficiency while decreasing water pollution.

By burning ganshi and dirt from coal mines, SGEP has been able to create economic benefits since its establishment. The application of technologies also reduced general operation costs and created additional environmental value.

In July 2007, SGEP enhanced its generation capacity by developing two 60MW generators, boosting company revenue and profits to \$56 million and \$5.2 million, respectively. In 2008, SGEP greatly increased its investment levels, which stimulated company revenue growth. However, in 2009, revenue is forecast to decrease by 48% due to some environmental restrictions.

Financial performance of Shandong Ganshi Electric Power Co., Ltd. - 2004 to 2009*

Year	Million Dollars Assets	% change Growth	Million Dollars Revenue	% change Growth	Million Dollars NPBT	% change Growth
2004	16.0	N/C	31.6	N/C	1.5	N/C
2005	12.9	-19.4	36.3	14.9	0.9	-40.0
2006	17.2	33.3	40.2	10.7	4.4	388.9
2007	18.0	4.7	56.0	39.3	5.2	18.2
2008*	150.0	733.3	126.9	126.6	17.7	240.4
2009*	66.0	-56.0	66.0	-48.0	5.2	-70.6

Source: Annual Report

Note: * 2008 and 2009 data are ACMR-IBISWorld estimates based on NBS data to November

Shandong Luneng Rongcheng Wind Power Co., Ltd.

Market Share: 1.5%

Shandong Luneng Rongcheng Wind Power Co., Ltd. (SLRWP) was established in 2004 with shares held by Luneng Development Group and Rongcheng Electric Power Corp. Rongcheng Electric Power Corp. is a state-owned enterprise operating in power generation, supply and installation, as well as industries such as electronic equipment manufacturing. The corporation has five thermal power plants and one wind power plant with total installed capacity of 93 MW.

Shandong Luneng Rongcheng Wind Power Co., Ltd. is located in Ningjin Town, the easternmost town in Jiaodong Peninsula. The total installed capacity of the wind power plant of SLRWP's first stage construction is 15 MW, consisting of 10 German wind turbines. Annual generated power can be up to 26 million KWh.

The wind power plant was put into production in December 2005 and created revenue of \$15.9 million in 2006. According to the National Bureau of Statistics, the total assets of SLRWP were \$3.4 million, which indicated the low initial cost and relatively high revenue of the company.

SLRWP's second construction phase began in March 2007, which involved 33 generators with total capacity of 49.5 MW, over three times the original capacity. For the year, company revenue increased to \$32.1 million. However, mainly due to increased construction costs, total profits decreased to \$1.3 million. In 2008, due to government assistance policies, SLRWP increased production capacity. In 2009, mainly due to intense competition, company revenue declined significantly.

Financial Performance of Shandong Luneng Rongcheng Wind Power Co., Ltd. - 2005 to 2009*

Year	Million Dollars Assets	% change Growth	Million Dollars Revenue	% change Growth	Million Dollars NPBT	% change Growth
2005	0.6	N/C	1.5	N/C	0.1	N/C
2006	3.4	466.7	15.9	960.0	1.6	1500.0
2007	2.2	-35.3	32.1	101.9	1.3	-18.7
2008*	65.3	2868.2	75.5	135.2	6.7	415.4
2009*	68.5	4.9	45.1	-40.3	-6.0	N/C

Source: Annual Report

Note: * 2008 and 2009 data are ACMR-IBISWorld estimates based on NBS data to November

Yingkou Wind Power Co., Ltd.

Market Share: 1.5%

Yingkou Wind Power Co., Ltd. (YWP) was established in August 1999 as a shareholding company. YWP completed the construction of its first stage plants in 1999 and its second stage plants in 2001.

YWP's wind power plants are located on Xianren Island in Liaoning Province, where the annual average wind speed is six meters per second. With the advantage of abundant wind power resources, a total of 49 wind turbines produced an installed capacity of 33.6 MW and annual generated power of 58 million KWh in 2007. For the year, company revenue and total profits increased to \$26.2 million and \$1 million, respectively.

Yingkou Wind Power Co., Ltd. developed steadily throughout the past six years. In 2004, however, legal action against YWP for noise pollution from its turbines resulted in a profit decline in 2005.

Recently, YWP's third stage plants were approved by the government and listed on the "National Debt Wind Power Project", which uses special national debt to subsidize the import of wind turbine manufacturing techniques and the purchase of wind turbines. This enhanced the developing speed of YWP and created revenue growth of 75.6% in 2006. The company developed significantly in 2008, before declining in 2009 due to increased competition and funding declines.

Financial Performance of Yingkou Wind Power Co., Ltd. - 2004 to 2009*

Year	Million Dollars Revenue	% change Growth	Million Dollars NPBT	% change Growth
2004	4.1	N/C	2.0	N/C
2005	8.6	109.8	0.3	-85.0
2006	15.1	75.6	0.6	100.0
2007	26.2	73.5	1.0	66.7
2008*	66.1	152.3	-3.8	N/C
2009*	26.8	-59.5	0.0	-100.0

Source: Annual Report

Note: * 2008 and 2009 data are ACMR-IBISWorld estimates based on NBS data to November

Qingdao Huawei Wind Power Co., Ltd.

Market Share: 1.4%

Qingdao Huawei Wind Power Co., Ltd. (QHWP) was established in August 2003. It is located in Jimo in Qingdao city, facing Bohai Sea. Therefore the sea wind can drive the wind power plants of QHWP to generate large volumes of electricity.

The initial investment of Qingdao Huawei Wind Power Co., Ltd was over \$17 million. Its first and second phase projects supply electricity to the grid with annual electricity supply of more than 30 million kWh. The third phase project was under construction in 2007. After its completion, the total installed capacity of QHWP will reach 30 MW with maximum supply of 60 million kWh.

Company revenue increased strongly in 2005, while profits increased dramatically. These strong growth rates were the result of the commencement of the company's second-phase project. Due to the third-phase project being constructed, QHWP reported strong growth again in 2007, with revenue increasing to \$24.2 million. The rapid development continued in 2008. In 2009, mainly due to large increases in production capacity across this industry, resulting in increased supply, company revenue declined.

Financial Performance of Qingdao Huawei Wind Power Co., Ltd. - 2004 to 2009*

Year	Million Dollars Assets	% change Growth	Million Dollars Revenue	% change Growth	Million Dollars NPBT	% change Growth
2004	16.8	N/C	1.3	N/C	0.1	N/C
2005	17.4	3.6	8.2	530.8	0.8	700.0
2006	14.2	-18.4	11.4	39.0	0.6	-25.0
2007	14.6	2.8	24.2	112.3	1.4	133.3
2008*	59.6	308.2	58.5	141.7	3.0	114.3
2009*	70.2	17.8	24.8	-57.6	8.9	196.7

Source: Annual Report

Note: * 2008 and 2009 data are ACMR-IBISWorld estimates based on NBS data to November

China Datang Corporation

Market Share: 1.3%

Established in December 2002, China Datang Corporation (CDT) is a large-scale power generation enterprise group. CDT is mainly engaged in the development, investment, construction, operation and management of power energy; the organization of thermal power thermal production and sales; electric power equipment manufacturing, maintenance and commissioning; development and consultation of power technology; contracting and consulting of electric power engineering and environmental protection projects; and renewable energy development.

As a subsidiary of China Datang Corporation, Datang (Chifeng) Renewable Power Co., Ltd. was founded in April 2006 and is mainly engaged in developing the wind resources of Chifeng and its surrounding area.

By the end of February 2008, the company had invested \$532.4 million in Chifeng. In 2007, with installed capacity of 230,000 KW, the company built and expanded three transformer stations of 220KV. With about \$72.6 million in total assets, the company is estimated to have received revenue of \$29 million in 2009.

OTHER PLAYERS

State Grid Northeast Maolin Wind Energy Development Co., Ltd.

Established in January 2002, State Grid Northeast Maolin Wind Energy Development Co., Ltd. (NEMWED) is located in Keshiketeng County, Inner Mongolia Autonomous Region. It is a shareholding company with its major share held by State Grid Northeast Maolin Industrial Company.

State Grid Northeast Maolin Wind Energy Development Co., Ltd's two wind farms are in operation and several others are under construction. The first one is located in Keshiketeng County with an installed capacity of over 50 MW, which was included to the "National Debt Wind Power Project". The second one is located in Huolingele City with an installed capacity of 50 MW.

NEMWED's revenue was rising steadily until 2005, when the last set of turbines started operation in its Keshiketeng farm, which resulted in growth of 100%. However, the construction of its Huolingele farm caused a drop in profit.

In 2006, the Huolingele farm was put to production. However, the new farm had only a small contribution to the company to the end of 2006. Profits were not high, as the company had plans to expand the installed capacity to 1000 MW over several years, which required continuous investment.

In 2007, the company worked with Datang Saihanba Wind Power Co., Ltd. to build the fourth and fifth stages of the Meidali wind power project. The newly installed capacity was 100 MW and company revenue totaled \$18.1 million. In 2008, the government encouraged the development of wind power and the company increased its investment in this. In 2009, mainly due to lower prices, company revenue declined.

Yancheng Refuse Incineration Power Co., Ltd.

Yancheng Refuse Incineration Power Co., Ltd. (YRIP) was established in 2004, and is located in Yancheng City, Jiangsu Province. Its two sets of generators started operations in mid- and late-2005 in succession. It can burn 600 tons of refuse per day, and generates 200 million KWh of electricity per year. Its revenue in 2006 was \$13.7 million.

All refuse produced in the urban area of Yancheng City is now burned by Yancheng Refuse Incineration Power Co., Ltd. The Yancheng government also has regulations that residential refuse must be processed by YRIP. In 2009, with total assets estimated at \$111.6 million, the company received revenue of about \$23.3 million.

Inner Mongolia Northern Longyuan Wind Power Co., Ltd.

Inner Mongolia Northern Longyuan Wind Power Co., Ltd. (IMNL) is a private company jointly established by China Longyuan Electric Power Group Corporation and North United Power Co., Ltd. IMNL start operations in December 2003. Until 2006, IMNL owned four wind farms, 151 installed wind turbines with total installed capacity of 82 MW. The annual electricity output was 160 million kWh.

Since its opening in 2003, IMNL has experienced rapid development, except for in 2009. In 2009, its revenue totaled \$20 million.

Inner Mongolia Northern Longyuan Wind Power Co., Ltd's parent company, China Longyuan Electric Power Group Corporation (Longyuan Group), is developing several other wind power energy projects. It has a long relationship with Gamesa from Spain to work together on wind generator projects. Gamesa has provided many generators along with associated technical support to Longyuan group.

Jilin Wind Power Co., Ltd. - Tongyu Wind Power Plant

Tongyu Wind Power Plant (TWPP) is a subsidiary of Jilin Wind Power Co., Ltd. TWPP was established in 1998. Its first-phase projects started operations in October 1999. In December 2000, its second phase project was completed. All 49 generators in these projects were imported from Spain and Denmark. Until the end of 2003, these generators had a total installed capacity of over 30 MW.

In 2004, some equipment was renewed, which caused a drop in total assets, while the national shortage of electricity stimulated a 13.8% rise in company revenue. In 2009, revenue decreased to \$16.2 million, mainly due to decreasing prices.

Shanghai Pucheng Development (Group) Co., Ltd.

Established in 1996, Shanghai Pucheng Development (Group) Co., Ltd (Pufa Group) was put into operation in 1998. By the end of 2007, Pufa Group had total assets of about \$4.38 billion. Pufa Group is mainly engaged in the management and development of land and real estate; investment, financing and management of city infrastructure projects; and construction.

Shanghai Pucheng Thermal Power Energy Co., Ltd. (SPTPE) is a subsidiary of Shanghai Pudong Development (Group) Co., Ltd. (SPDG). SPDG was established in 1998 as a state-owned enterprise that is in charge of financing and assets management of the priority and important projects from the Pudong New Area Government. SPDG has a wide range of businesses, such as land development and environmental protection.

Shanghai Pucheng Thermal Power Energy Co., Ltd. was established as a company for the construction, operation and management of a refuse burning plant. The plant is in Pudong New Area and was built to burn the household waste produced in the area. The plant was the first modernized burning plant for household waste in China that had a daily capacity of over 1,000 ton. It is regarded as a demonstration project that can not only reduce pollution from household waste in the area, but also promotes the development of related environmental protection industries.

The refuse burning plant was put into production in May 2003. With the continued development of the Pudong New Area, company revenue increased strongly, before declining in 2009.

Financial Performance of State Grid Northeast Maolin Wind Energy Development Co., Ltd. - 2004 to 2009*

Year	Million Dollars Assets	% change Growth	Million Dollars Revenue	% change Growth	Million Dollars NPBT	% change Growth
2004	51.8	N/C	7.4	N/C	4.5	N/C
2005	55.2	6.6	14.8	100.0	4.4	-2.2
2006	53.5	-3.1	14.7	-0.7	2.2	-50.0
2007	59.9	12.0	18.1	23.1	3.7	68.2
2008*	224.7	275.1	31.0	71.3	10.2	175.7
2009*	393.4	75.1	21.9	-29.4	4.1	-59.8

Source: Annual Report

Note: * 2008 and 2009 data are ACMR-IBISWorld estimates based on NBS data to November

Financial Performance of Inner Mongolia Northern Longyuan Wind Power Co., Ltd. - 2004 to 2009*

Year	Million Dollars Assets	% change Growth	Million Dollars Revenue	% change Growth	Million Dollars NPBT	% change Growth
2004	64.1	N/C	8.3	N/C	1.5	N/C
2005	65.7	2.5	10.5	26.5	1.7	13.3
2006	67.8	3.2	16.0	52.4	1.8	5.9
2007	71.2	5.0	16.7	4.4	0.0	-100.0
2008*	56.4	-20.8	29.0	73.7	2.1	N/C
2009*	62.1	10.1	20.0	-31.0	-0.3	N/C

Source: Annual Report

Note: * 2008 and 2009 data are ACMR-IBISWorld estimates based on NBS data to November

Financial Performance of Tongyu Wind Power Plant - 2004 to 2009*

Year	Million Dollars Revenue	% change Growth	Million Dollars NPBT	% change Growth
2004	7.4	N/C	1.2	N/C
2005	7.9	6.8	1.5	25.0
2006	7.5	-5.1	1.7	13.3
2007	12.8	70.7	0.8	-52.9
2008*	23.2	81.2	9.4	1075.0
2009*	16.2	-30.2	1.1	-88.3

Source: Annual Report

Note: * 2008 and 2009 data are ACMR-IBISWorld estimates based on NBS data to November

Financial Performance of Shanghai Pucheng Thermal Power Energy Co., Ltd. - 2004 to 2009*

Year	Million Dollars Revenue	% change Growth	Million Dollars NPBT	% change Growth
2004	14.8	N/C	5.3	N/C
2005	15.0	1.4	7.7	45.3
2006	17.0	13.3	10.4	35.1
2007	19.6	15.3	11.4	9.6
2008*	34.0	73.5	5.8	-49.1
2009*	23.3	-31.5	3.9	-32.8

Source: Annual Report

Note: * 2008 and 2009 data are ACMR-IBISWorld estimates based on NBS data to November

Industry Performance

CURRENT PERFORMANCE

With electricity shortages across China in 2003 and 2004, the Alternative Power Generation Industry in China developed rapidly from 2006 to 2010.

In 2010, industry competition is expected to intensify as more firms enter this industry to benefit from strong revenue and profit growth. However, mainly due to government assistance and incentive programs, the industry will continue to develop rapidly in 2010, with forecast revenue growth of 28.5% for the year to \$6.05 billion (constant 2010 dollars). In addition, according to government projections for alternative energy development, the installed capacity of biomass power generation and solar energy electricity generation will reach 5,500 MW and 300 MW, respectively, in 2010.

Industry revenue is estimated to increase by 73.1% in 2009 as demand remains high and as government assistance continues. In 2009, the Chinese government paid more attention to the development of the Alternative Power Generation Industry and adopted many policies and methods to stimulate the industry's development.

Industry revenue increased by 53.5% in 2008 as demand, capacity and output increased significantly, and as government policies promoting alternative energies continued. For the 2008 Beijing Olympics, the government reduced thermal generation around major cities and implemented various renewable power generation methods and energy-saving regulations.

Additionally, total industry assets in 2008 increased strongly as enterprises benefited from government support via the Energy Law in 2009 and enlarged their investment. However, the expected establishment of the Ministry of Energy did not occur in the reorganization of Ministries in early 2008, which indicated the energy policy in the near future will not involve significant change.

In 2007, as more enterprises entered this industry, industry revenue increased by 49.8%. With the Renewable Energy Law being implemented in 2006, the industry resumed its rapid development after an industry revenue decline in 2005. Industry revenue increased by 170.7% in 2006.

Wind power generation

In the five-year period to 2010, the wind power generation segment developed rapidly, due to the Ministry of Finance and the State Administration of Taxation reducing the VAT (Value-Added Tax) rate from 17% to 8.5% for wind power generated electricity in that year.

The installed capacity increased from 468 MW in 2002 to 25.8 GW (giga-Watts) in 2009, with a compound growth rate of over 75%.

Large capacity wind power generators were free of import tariffs as the government wanted to encourage wind farm construction. However, this policy increased industry assistance expenses for the government and slowed the development of domestic wind power generator manufacturers. In 2004, the top five global wind power generator manufacturers that supplied the wind power generation segment in China had Goldwind as the only domestic manufacturer.

In July 2005, the "Notice on Related Requirement of Wind Power Project Management" was released. The Notice requires new wind farms to have over 70% Chinese-made wind power equipment of their total equipment, and states the provision that imported equipment is subject to taxation. This helped domestic manufacturers to expand their businesses, as well as forcing foreign manufacturers to find partners in the domestic market to produce "Chinese-made" equipment.

In April 2008, the Ministry of Finance released a notice to increase import tariffs for certain wind power generators and their parts. However, wind power generators with a capacity of 2.5 MW can still benefit from zero import tariffs. The notice further encourages domestic wind power generator manufacturing, while still welcoming high-capacity equipment to accelerate wind power development.

As wind power generation is China's new-energy priority that the government is encouraging for development, and with advanced and inexpensive Chinese-made equipment reducing construction costs, this segment will maintain rapid growth in the future.

In 2009, China's accumulated installed wind power capacity had surpassed that of Germany and was the second-highest in the world. In addition, the government released several wind power policies, such as setting on-grid wind power prices, and assisting large and medium-sized private wind power enterprises. Mainly due to increasing scale of the wind power segment and strong competition, wind power prices declined for the year.

Refuse burning electricity generation

Refuse burning includes the burning of household wastes, ganshi (rocks that contain low coal content), and gas from coal mines. In recent years, Chinese cities have expanded so rapidly that land suitable for refuse disposition is scarce. Power generation from refuse burning has become a solution for reducing refuse while enhancing power supplies.

The Chinese government encouraged the appropriate use of ganshi in the 1980s. In 2002 and 2003, ganshi burning power generation started to be developed. Many small generation plants were established around coal mines, especially in Shanxi Province, although most of them were too small to be included in data from the National Bureau of Statistics.

In 2005, there were 26 companies that were engaged in power generation via household waste burning. The Renewable Energy Law also contains provisions that encourage the development of this sub-segment. However, the debate on the secondary pollution produced by waste burning hinders its development, and requires the State Environmental Protection Administration to strictly implement the standards for waste burning.

Solar energy electricity generation

Currently, most solar power generation capacity is located in Tibet to supply remote residential districts with electricity. Although China encourages the use of solar energy, it is also the most expensive as China has no technologies to produce crystal silicon, the core raw material of solar cells. Until fully Chinese-made solar cells are developed, solar energy plants can only be built through specially-funded projects.

Wind Farm Development in China - 2005 to 2009

Year	Units Generators	Units Farms	MW Installed capacity	% change Growth
2005	1864	62	1266	N/C
2006	3311	91	2599	105.3
2007	6469	158	5906	127.2

2008	11600	N/A	12153	105.8
2009	21544	N/A	25800	112.3

Source: China Wind Energy Association

HISTORICAL PERFORMANCE

The Alternative Power Generation Industry in China started its development in the 1980s.

Wind power generation started in 1986. The installed capacity in 1990 was 4.1 MW, which grew to 399 MW in 2001. The speed of this increase was relatively fast, although the overall quantity was still small.

In January 1998, China Customs granted tax-free rates for wind power generators with capacity of more than 300 KW. In February of the same year, the State Development Planning Commission announced policies for assisting renewable energy, especially wind power generation development. These factors boosted industry revenue growth by 145% in 1999. However, without assistance from the government, players reduced their scale in the following two years to maintain profitability levels.

In 2001, several rules and methods to guide the development of wind farms, such as "Methods for Acceptance Inspection of Wind Farms", were released in order to ensure the quality and efficiency of wind farms. With these new regulations, the government started to support new energy development, which resulted in the entry of several enterprises, as well as the exit of some old and low-efficient enterprises. Therefore, industry revenue dropped 33.8% in 2001 from the previous year, while employment increased by 41.7%. The new enterprises had higher generation efficiencies, which resulted in increased profitability for the year.

Until 1998, solar energy plants with a capacity of about 8.8 MW in total had been built in Gansu Province, Tibet Autonomous Region, and Beijing.

Up until 2001, there were geothermal plants with capacity of 32 MW, and tidal generation plants with capacity of 11 MW.

New energy generation plants were deployed for the purpose of supplying electricity for remote and rural areas that were unable to access electricity grids, especially where small hydroelectric power plants cannot be deployed. Small hydroelectric power plants were given a higher priority to develop than any new energy projects before the end of 1990s.

In 2004, total industry revenue jumped by 208% to \$618.4 million (constant 2010 dollars), and total assets rose 107% for the year. These large increases were attributed to the expansion of national power grids that connected remote new energy plants to the urban networks, and the electricity supply shortage that attracted companies to invest in new energy projects. Additionally, government assistance helped the industry to quickly finish construction projects and start selling electricity. However, the 208% grow of revenue indicates a likely over-expansion for the year, which saw a correction in 2005.

Following very strong industry revenue growth in 2004, industry revenue then fell 29.4% in 2005, while total assets rose 47.7%. This was the result of the electricity supply recovery. Electricity shortages were alleviated in 2005 with the rapid development of thermal generation plants. The further impoundment (storing more water in the reservoir) in the Three Gorges Project with more generator sets commencing operations, and the accomplishment of inter-regional grids centered in the Three Gorges Project ensured the supply capacity in peak periods. The rise of total assets was due to new entrants in previous years, which were attracted by the release of the Renewable Energy Law, and the resulting expansion of the industry.

In the Tenth Five-Year Plan period (from 2000 to 2005), renewable energy, including new energy, had experienced its fastest development. Many new wind farms had been built, advanced technologies had been researched or imported, and wind power generator manufacturing had become competitive.

Wind Farm Development in China - 2002 to 2005

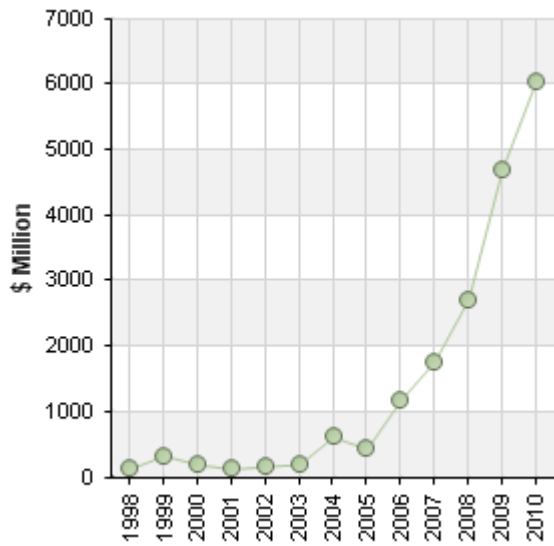
Year	Units Generators	Units Farms	MW Installed capacity	% change Growth
2002	904	32	468	N/C
2003	1042	40	567	21.2
2004	1292	43	764	34.7
2005	1864	62	1266	65.7

Source: China Wind Energy Association

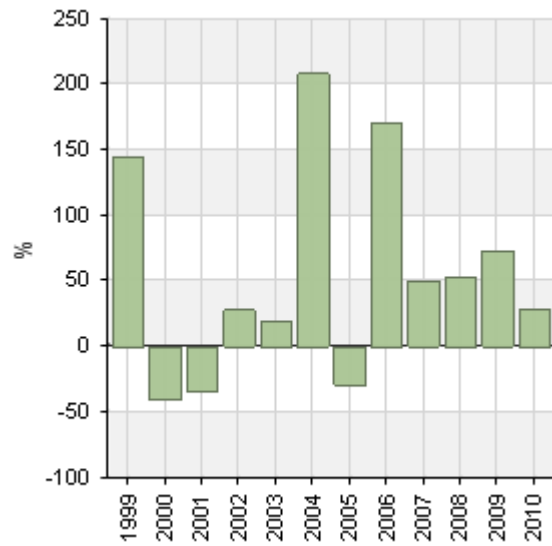
Revenue (constant prices)

	Revenue \$ Million	Growth %
1998	136.3	N/A
1999	333.2	144.5
2000	198.3	-40.5
2001	131.3	-33.8
2002	167.9	27.9
2003	200.8	19.6
2004	618.4	208.0
2005	436.8	-29.4
2006	1,182.3	170.7
2007	1,770.6	49.8
2008	2,717.0	53.5
2009	4,703.6	73.1
2010	6,045.6	28.5

Revenue



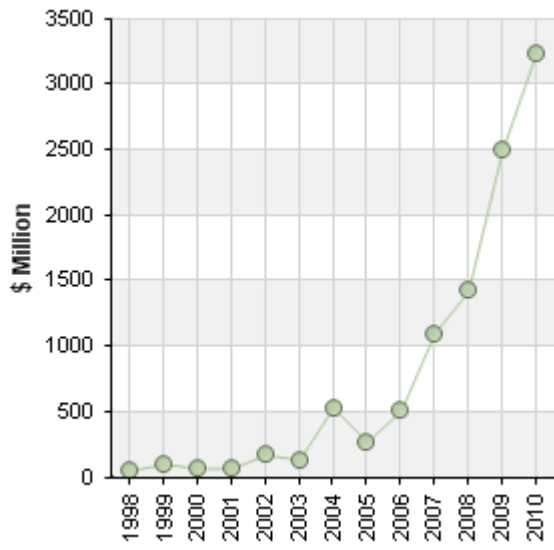
Revenue Growth Rate



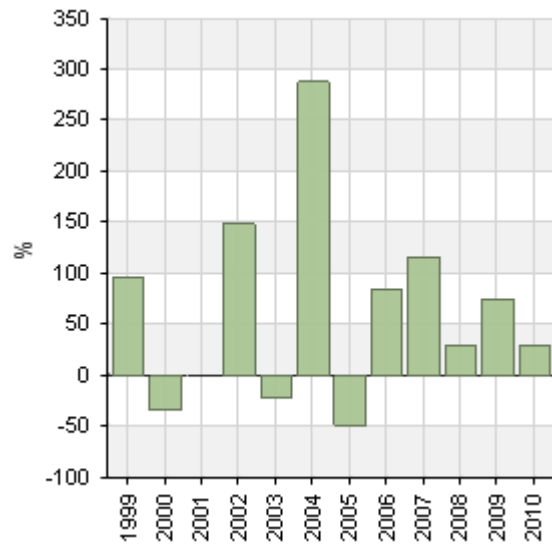
Gross Product (constant prices)

	Gross Product \$ Million	Growth %
1998	53.0	N/A
1999	104.4	97.0
2000	68.9	-34.0
2001	69.7	1.2
2002	173.6	149.1
2003	137.5	-20.8
2004	533.8	288.2
2005	273.9	-48.7
2006	507.2	85.2
2007	1,098.6	116.6
2008	1,422.9	29.5
2009	2,492.9	75.2
2010	3,234.4	29.7

Gross Product



Gross Product Growth Rate

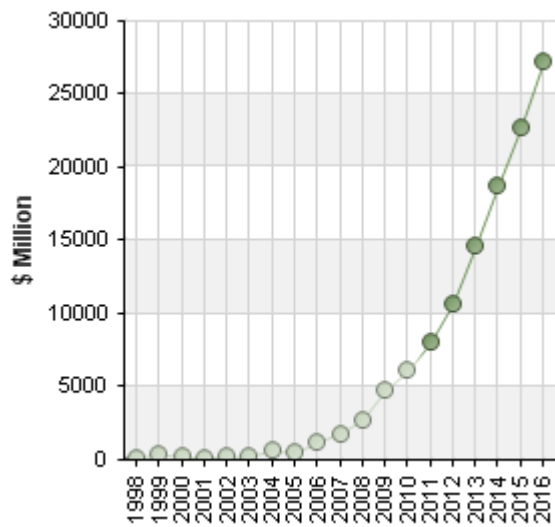


Outlook

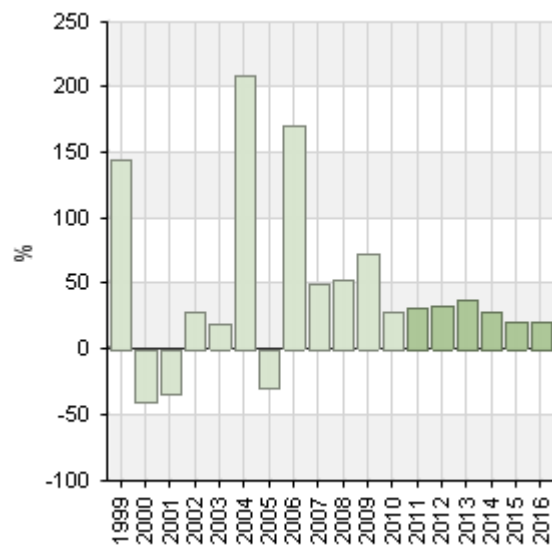
Revenue (constant prices)

	Revenue \$ Million	Growth %
2011	7,980.1	32.0
2012	10,653.5	33.5
2013	14,574.0	36.8
2014	18,713.0	28.4
2015	22,642.7	21.0
2016	27,171.3	20.0

Revenue



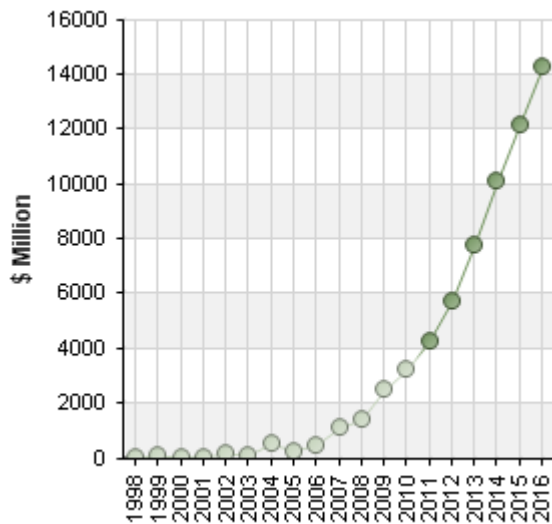
Revenue Growth Rate



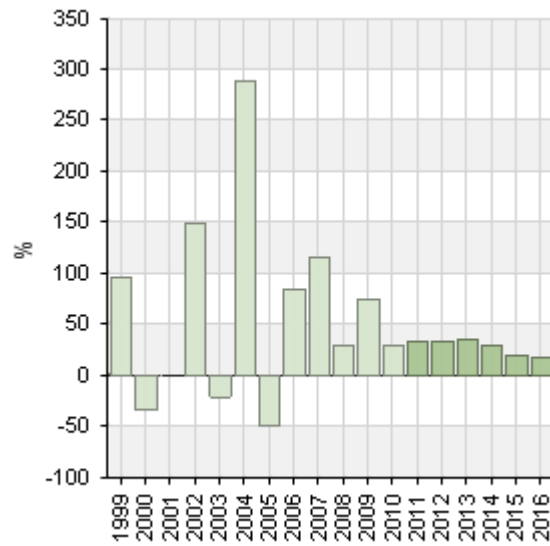
Gross Product (constant prices)

	Gross Product \$ Million	Growth %
2011	4,293.3	32.7
2012	5,752.9	34.0
2013	7,811.7	35.8
2014	10,086.3	29.1
2015	12,181.8	20.8
2016	14,264.9	17.1

Gross Product



Gross Product Growth Rate



The Chinese economy is expected to continue developing at a rapid rate in the five years to 2015. A fast-growing economy requires stable and sufficient energy supplies. However, existing coal and petroleum storage volumes are not sufficient to supply the country over the next 50 years. To achieve sustainable development, China must develop new energy sources, be able to operate on multiple energy sources, and depend on long-term energy resources.

The government continues to release policies and regulations to address and develop renewable energy programs and sources. The Renewable Energy Law is one of the most significant steps the government has made to developing this industry.

In recent years, China's wind power capacity was increased to 10 GW (giga-Watts), and will increase further in the outlook period to 2015. Also, in China's eastern coastal areas and in North East China, North West China and North China, large-scale wind farms will continue to be built, forming several GW-level wind farm bases. Additionally, MW-level wind power generators will continue to be planned, constructed and put into operation.

Solar energy will expand to urban areas in the outlook period to 2015. Some projects have been trialed in new subdistricts in East China, which includes roof solar cells and solar water heaters, as well as solar street lamps. These projects reveal economic benefits along with environmental advantages. However, the costs of solar cells are expected to be high in the near future, which hinders household intentions to employ solar generation. Therefore, in future years, the major application of solar generation will still be electricity solutions for remote areas. At the same time, solar cells will be deployed on public buildings in developed medium and large-sized cities. By the end of 2010, the total solar generation capacity is expected to be 300 MW.

The Chinese government also plans to continue to develop biogas and biomass generation projects. In 2005, the capacity of biomass generation had reached 2 GW and by 2010, there is expected to be another 5.5 GW capacity of the biogas, biomass and refuse burning generation segments.

Developed countries will invest more for new energy projects in China to purchase CERs (Certified Emission Reduction) through CDMs (Clean Development Mechanism), which will promote the financial status of new energy development.

China's new Energy Law will provide more strategies to regulate the energy sector and form the multiple-energy-source structure for the country. The forming of the new structure will provide opportunities for new energy projects, which will result in faster growth in 2011 and the following years.

In the five years to 2015, the industry is expected to experience rapid and steady growth of around 30.2% in revenue a year. The increase in employment levels and total industry wages provides an indication of the requirements for many skilled and qualified technicians by the entry of many new enterprises, as well as the expansion of existing enterprises, which will lead to increases in the numbers of establishments and enterprises. Total industry assets are also forecast to increase at an annualized growth rate of 21.9% in the outlook period.