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China Renewable Energy and Sustainable Development Report

China's extraordinary economic growth and heavy reliance on increasingly expensive foreign oil, the vast environmental toll that is one of the most apparent costs of China's economic success, persistent rural poverty in China and periodic power shortages all have impressed upon Beijing that renewable energy must be a large part of China's economy if China is to both complete its economic transformation and achieve "energy security".

China rapidly has moved along the path of renewable energy development. By 2006 China's total renewable energy output equaled 8% of non-renewable energy generation or 200 million MT of coal equivalents, though coal generated power consumption continued to account for 69% of total energy consumption in China. China's goal is for renewable energy to account for 10% of all energy consumption by 2010. In the medium term China plans to develop 120,000 MW's of renewable energy by the year 2020; this would account for 12% to 16% of China's total installed energy producing capacity that year. In the long term China has set an objective of having 30% or more of its total energy requirements satisfied by renewable sources by 2050. China's ambitious growth target for renewable energy production will require an investment of approximately 2 trillion Yuan (~$263 billion U.S.D.) by 2020.

Our goal at the ***China Renewable Energy and Sustainable Development Report*** is to provide authoritative, timely, informative and useful information about the emerging renewable energy and sustainable development sectors in China for global companies who have products and services to sell to or buy from China's rapidly growing renewable energy and sustainable development sectors and other policy makers, NGOs and interested parties. Drawing from original Chinese language materials of Chinese companies, industry associations, central and local government agencies and non-governmental organizations, the ***China Renewable Energy and Sustainable Development Report*** will cover developments in China's solar, wind, bio-fuel, bio-mass, small hydroelectric and other renewable energy sectors, including regular features on investment, growth, local and national laws and regulations, leading Chinese companies, industry meetings, tradeshows, exhibitions and conferences and business opportunities.

An interactive map of China's renewable energy projects is now available on China Strategies' website. China Strategies' website also now has a map of significant companies/projects in China in the solar energy sector. To view the *China Renewable Energy Interactive Map* and the *China Solar Map*, visit www.chinastrategiesllc.com, click on the tab for "China's Renewable Energy Industry" and follow the directions to register and receive access. We invite our readers to submit Chinese renewable energy

projects to be included on the *China Renewable Energy Interactive Map* and the *China Solar Map*. Please send all submissions to lou@chinastrategiesllc.com. Shortly the *China Renewable Energy Interactive Map* will be upgraded to include a host of additional projects, including nearly 150 Chinese CDM projects.

The *China Renewable Energy Interactive Map* and the *China Solar Map* were developed with the assistance of Ryan Hodum, an environmental and renewable energy professional who recently completed a Master of Arts in Global Environmental Policy from American University in Washington, D.C. with a focus on renewable energy utilization in China. The *China Renewable Energy and Sustainable Development Report* and the *China Renewable Energy Interactive Map* have also benefited from the assistance of Alan Brinker, a very talented first year MA student at Johns Hopkins School of Advanced International Studies.

For more information about subscribing to the ***China Renewable Energy and Sustainable Development Report***, please contact us at lou@chinastrategiesllc.com. For more information about China Strategies, LLC, please visit us at www.chinastrategiesllc.com.

This Month's Top Story

A report from the State Electricity Regulatory Commission documents the extent of disruption that the weather disaster of January and February 2008 caused. The national power grid (which includes the State Electric Grid Company's system, the Southern Electric Grid Company's system, local electric power grids and the power lines which power plants use to transmit power that they generate) lost power on a total of 35,761 power lines, including 120 high tension power lines carrying 500 Kv, 354 power lines carrying 220 Kv, 900 power lines carrying 110 Kv and 34387 power lines carrying 10-35 Kv. The snow emergency also was responsible for the loss of function of 2008 transformers. The reports of the State Electricity Regulatory Commission from late January 2008 through late February 2008 show the extent of the disruption of power due to the snow disaster. As of January 29, 2008 the SERC reported that nationally a total of 8.635 billion Kwh of power was generated in China that day; on February 3, 2008 daily power generation had dropped to 7.953 billion Kwh; on February 5, 2008 daily power generation had dropped to 7.043 billion Kwh; on February 6, 2008 daily power generation had dropped again to 6.77 billion Kwh; on February 7, 2008 daily power generation had dropped further to 6.502 billion Kwh and on February 8, 2008 daily power generation had dropped to a low of 6.4 billion Kwh. China's daily power generation did not return to its January 29, 2008 levels until February 18, 2008. The extreme weather basically paralyzed the Guizhou power grid and resulted in the loss of power to approximately 11,000 administrative villages beginning in mid-January 2008; as late as February 20, 2008 there were still some 1000 villages without power. In all more than 30 million households throughout China lost power as a result of the snow emergency.

The severe weather, which struck a large swath of China in January and early February 2008 revealed the fragility of China's power network and displayed China's over-reliance on coal-fired power. Both the direct damage to power plants and the disruption of shipments of coal to power plants caused by the weather emergency resulted in a severe reduction in availability of power throughout China, which in turn disrupted the economy at all levels. A measure of the direct costs to the economy of the snow disaster is the number of insurance claims, which have been filed; as of February 24, 2008 there were a total of 947,000 insurance claims filed and the Chinese insurance industry already has paid out more than 1.6 billion Yuan funds to begin to satisfy those claims. With respect to the indirect cost of the weather disaster in China, to address the sudden disruption of power, Beijing ordered large users of power, including companies in the aluminum and steel industries, to cut back or shut down operations. This has resulted in significant loss of output. Analysts now predict, for example, that China's primary aluminum industry will produce 350,000 MT *less* of primary aluminum in 2008 than it would have had there not been the snow disaster. As another example, direct economic injury to China's largest oil and gas companies---CNPC and Sinopec, alone may be as high as 600 million Yuan.

The extreme weather has raised this question: what would happen to China's rather fragile power infrastructure and economy if the weather conditions were just somewhat more severe the next time? The extreme weather also has raised the question with some Chinese of whether such unusual weather is a result of global warming. Whether the snow emergency that China experienced is a result of global warming or a fluke weather event, the issue of how to best address such circumstances has lead a number of experts to conclude that the greater use of alternative energy resources and the greater implementation of distributed power networks would help alleviate a power emergency if there was a reoccurrence of such severe weather conditions.

China's Solar Industry

A recent analysis of China's multi-crystalline silicon production and anticipated expansion concludes that at present there is approximately 63,500 MT of multi-crystalline silicon capacity in place or under construction and that by 2008 the total capacity to produce multi-crystalline silicon will have increased to 18,000 MT.

A report issued by the National Industry and Commerce Joint New Energy Business Association estimates that China's capacity to produce silicon materials, silicon ingot, silicon wafers, cells and modules presently is, respectively, 25 MW, 580 MW, 500 MW, 1400 MW and 1087 MW; this level of capacity places China third worldwide. The report estimates that by 2010 China's PV power industry will be the world's largest with more than 1000 MW of capacity to produce solar cells.

The National Industry and Commerce Joint New Energy Business Association report on China's renewable energy industry estimates that there are approximately 1300 companies that are manufacturing solar hot water heaters, and the vast majority of those

companies are private companies. The rapid development of the solar hot water heater industry has been a force in spurring development of the glass, metals, insulation and vacuum industries.

China's first solar power 5-star hotel is nearing completion in the high technology development district in the city of Baoding, Heibei Province. The south, east and west walls of the hotel are comprised of glass walls constructed with solar panels and the total capacity of solar power generation is 0.3 MW; this amount of power generation will be able to provide the power requirements of the hotel and excess output will be channeled back into the grid.

The city of Wuhan has issued new regulations, which when they take effect on April 1, 2008, will require that all residential buildings, hospitals, school dormitories, hotels, recreation facilities and swimming pools, as well as all government buildings, civilian buildings constructed with government investment and residences for farmers, which are less than 12 stories tall, have a solar hot water heating system included in the design.

The China Electric Power Investment Group Co. will invest 5 billion Yuan to construct a 1000 MW photovoltaic solar cell project in Xian, Shaanxi Province. The China Electric Power Investment Group Co. also is planning on pursuing a multi-crystalline solar project in the city of Xining in Qinghai Province.

The {China Photovoltaic Development Report}, which was issued by the Renewable Energy Experts Committee of the China Resources Comprehensive Utilization Association states that "if the Chinese solar energy industry receives the government's support", by 2030 the installed capacity of China's solar energy photovoltaic power generation will reach 100,000 MW and the output of solar power will be 1.3 trillion Kwh/year; this level of installed capacity of photovoltaic power in China would equal 30 large-scale coal-fired power plants. The report points out that at present 90% of the photovoltaic products which are produced in China are exported to Europe, the U.S. and Japan and domestic use of solar power is largely concentrated in agricultural villages away from the power grid; solar power that is grid-connected still has not become a reality in China. An example of the small-scale solar power projects which are being developed in rural areas is the 6300 watt solar power plant constructed for ~500,000 Yuan in the village of Miaogou in the mountains of Henan Province. The whole village has 8 households with total of 30 residents. The small-scale solar power plant produces an average of 50 Kwh/day, enough to provide power for the village resident's power needs.

China's Wind Power Industry

Chuan Chenyu, the General Manager of the China National Offshore Oil Company said recently that installation of a 15 MW offshore wind farm more than 60 Km from land in the Bohai Sea is nearing completion. General Manager Chuan also said

that in the next five years CNOOC would be making significant additional investments in the area of energy conservation and environmental protection. He added that CNOOC sees itself as an energy company, not simply an oil company and that oil would be just one of its core businesses.

A report issued by the National Industry and Commerce Joint New Energy Business Association estimates that the installed capacity of wind power in China by 2040 or 2050 may reach 500,000 MT to 1 million MT. In the next five years, eastern China's coastal regions, the Northwest, the Northeast and eastern China cumulatively will build 30 or more 100 MW class wind projects and will create three 1000 MW 'bases' in Jiangsu, Hebei and Inner Mongolia.

China will erect a total of 400 towers for measuring wind in regions of China that are known to have particularly rich wind resources. These 400 towers will be from 70 meters to 100 meters in height. According to the Gansu Province Climate Bureau's Wind and Solar Energy Assessment Center, Gansu Province will erect 17 seventy meters tall and 2 one hundred meters tall towers for measuring wind in the Hexi corridor and other locations.

Heilongjiang Province and its capital Harbin are making strides to develop wind power and are also planning to develop an indigenous industry to produce the machinery and equipment for wind power development. According to the provincial climate bureau, wind resources in Heilongjiang Province are the 5th richest in China; the areas along the Songjiang River Valley (including Harbin, Yilan, Fangzheng and Tonghe) are particularly rich in wind resources. Surveys indicate that the wind resources in Harbin alone total 10,000 MW of power and that with existing technology the exploitable wind power in Harbin is ~ 1000 to 2000 MW. According to Wei Changbo, the head of the Technology Innovation Office within the Harbin Economic and Trade Committee, it 'will not be a problem' for Harbin companies to generate wind power related sales of 5 billion Yuan/year by 2010 and there is a possibility that that amount might rise to 10 billion Yuan/year by 2010. The Mulan Wind Power Plant, which was started up in 2004, has installed capacity of 12 MW. The city of Harbin is planning a 240,000 square meter 'Wind Energy Park' within the existing Pingfang Economic Development District; the plans are to attract complete windmill manufacturers and windmill parts manufacturers to join such existing entities as the Harbin Wind Power Company, the Harbin Flight Industry Company, the Jiuzhou Power and Gas Co. and Fenghua Company.

Estimates are that the cost of producing wind power is ~0.2 Yuan/Kwh higher than the cost of producing power at a coal-fired power plant, but because of government subsidies consumers do not pay more for wind power than for coal generated power. According to Mr. Zhang Jian of the Power Equipment Division of the Longyuan Energy Group in Zhejiang Province, the cost to construct 1 MW of wind power is 8000-10,000 Yuan (at 0.4-0.5 Yuan/kwh the cost is 1 to 2 times higher than the cost of construction of a coal-fired power plant) and the on-grid cost of power is 0.8 Yuan/Kwh (this might be a somewhat optimistic assessment given that at present the price of power on-grid in Zhejiang Province is generally at 0.6 Yuan/Kwh, which is thought to be the breakeven

point for wind power generation) so that if the wind turbine's load is 1600 to 2000 hours/year, the company can recover its investment in 10-15 years; this would amount to a 8%-10%/year return on investment. The marginal profitability of wind power highlights the importance of the Kyoto Protocol CDM regime in providing additional revenue to wind power projects. The variations in cost to construct wind power can be significant depending on where the wind farm is located. According to the deputy general manager of the Hangzhou Hupo Investment Energy Science and Technology Co., Ltd., the developer of the Yuhuan Dachen Island Wind Farm, because the most ideal locations for wind farms in Zhejiang Province are in remote locations on islands, the cost of construction is higher than less remote locations. The Dachen Island location, for example, required the developer to build a road to the mountaintop where the wind turbines were to be sited in order to transport the machinery and equipment to the site; this of course was an added cost. On the other hand, because sea-based wind farms produce more power on average than land-based wind farms (by a factor of 20%-40%), at present the vast majority of Zhejiang Province wind farms are on the coast or off the coast in the East China Sea or the Hangzhou Bay, including such locations as Zhoushan, Ningbo, Taizhou and Wenzhou, all of which will soon have wind farms.

There are reports that a number of Chinese companies, in their pursuit of wind power projects have won with bids so low that they are likely to be losing money from the start. One example of this is the Beijing International Electric Power New Energy Co., Ltd., which won the contract to develop the Inner Mongolia Huitengxile project with a price of 0.382 Yuan/Kwh; this price per Kwh is equivalent to the price of Shandong Province's coal-fired plants. A project such as this will only begin to break even if the price of power is allowed to increase.

In order to spur the development of an indigenous wind power equipment industry, Beijing has mandated that all new wind power projects much have a Chinese component of at least 70%. According to Chen Deming, the Deputy Minister of Commerce, through the end of 2006 there were a total of more than 100 Chinese companies producing products for the wind industry. Despite this the Chinese wind power equipment industry is still not able to produce megawatt class wind turbines and certain parts, such as bearings, must be imported at a cost of 300,000 Yuan/each. Foreign wind power equipment manufacturers, including Denmark's Vestas, India's Suzlon, Spain's Gamesa and GE Energy have aggressively established joint venture or wholly foreign-owned companies in China and now have a 10% share of the Chinese market. At 60 million Euros, Gamesa's factory in Tianjin, which manufactures wind turbines, is the Spanish company's second largest foreign investment (after the U.S.).

China's Waste to Energy Industry

Construction on the Shanxi Province's first household waste-to-energy plant is proceeding. The developer of the waste-to-energy power plant is the Jiaxiu City Guotai Green Energy Co., Ltd. A portion of the 157.82 million Yuan cost of the Jiaxiu city household waste-to-energy facility is being financed by public financing. The plant is

designed to be able to handle 500 tpd and the energy output is expected to reach 11,200 Kwh/year. All of the machinery, equipment and technology have been sourced domestically. The plant, which broke ground in April 2007, is expected to begin generating power and be connected to the power grid in June 2008.

China's Bio-Mass Energy and Bio-Fuels Industries

A focus of bio-energy development in China is the growth in methane production. A report issued by the National Industry and Commerce Joint Energy Business Association estimates that by 2010 China's output of methane gas will reach 15.5 billion cubic meters and more than 4000 households in China will use methane gas; by 2015, the report estimates, output of methane gas will rise to 23.3 billion cubic meters and the number of households that will be using methane will also have increased to 6000. This same report also indicated that as of the end of 2007 China had approximately 2200 MW of biomass power generating capacity. In the ensuing years bio-mass power generation in China will increase rapidly and by 2010 it is estimated that China will have installed capacity to produce biomass power totaling 5000 MW; by 2020 biomass power generating capacity is expected to make another leap to 30,000 MW.

China's Geo-Thermal Industry

There are quite a few geo-thermal wells in China at a depth of 2500 meters and there are some geo-thermal wells at a depth exceeding 3600 meters. The geo-thermal well with the hottest water is Tibet's Yangbajing ZK2001 well, which registers 250^0 C. Geo-thermal is used broadly in China to produce electricity, provide heat and in industrial uses, bathing, aquaculture, medical treatment, greenhouse agricultural, mineral water, mineral spas and agricultural irrigation. The Tianjin Environmental Protection Bureau's geo-thermal station, which produces hot water from a depth of 3323.09 meters, (having a temperature of 84^0C and a velocity of 150 cubic meters/hour) is used to provide heat to residents occupying nearly 100,000 square meters of residences. In Kunming, Yunnan Province a geo-thermal well is used to support a "hot springs vacation center". In Yingshan County, Hubei Province has utilized geo-thermal resources since the 1980s and estimates that industry in the county is producing nearly 45 million Yuan in output related to the geo-thermal resources. A national survey of geo-thermal locations revealed that there were 748 geo-thermal locations, of which ~434 or 60% were being utilized; of those being utilized the total volume of water was 936,659 cubic meters per day and the total power utilized was 1791.13 MW or 1.9274 million tpy of coal equivalent power generation. Beginning in the 1970s China began using geo-thermal to generate power and among other places built demonstration geo-thermal power plants in Guangdong's Dengwu, Hunan's Huiyang, Jiangxi's Zhuochuan, Guangxi's Xiangzhou, Shandong's Zhaoyuan, Liaoning's Xiongqiu and Heibei's Houchiwo. With the exception of the geo-thermal power plants in Guangdong and Hunan, the other plants have been shut down due to the low temperature of the water. In the 1980s the Yangbajing geo-thermal power plant was constructed in Tibet; the total installed capacity was 30.4 MW

when constructed and now is 25.18 MW, but its actual power generation is now at ~15 MW. The temperature of the water, which is used by the Yangbajing geo-thermal power plant is between 130-170^0 and the volume of the water is 109,500 cubic meters/day; the Yangbajing geo-thermal power plant provides power to the city of Llasa. Tibet's other geo-thermal power plant is the 3 MW Nequ Geo-thermal Power Plant, which has an average temperature of 114.5^0 C and a water volume of 25,000 cubic meters/day; this provides power to Nequ, which is located northeast of Llasa. The use of geo-thermal resources to provide heat to residences has grown since first being introduced in the 1970s; at present there are some 21 locations in Beijing, Tianjin, Hebei, Liaoning, Jiangsu, Henan, Shaanxi and Qinghai, which cumulatively produce heat for a total of nearly 4 million square meters of living space. Of this total coverage of geo-thermal heating for residences, the Tianjin area has grown most quickly, now amounting to some 3 million square meters of living space heated by geo-thermal sources; second to Tianjin in utilization of geo-thermal heating is Beijing with coverage area totaling 327,000 square meters (including the Southeast quadrant and the Xiaotangshan geo-thermal field). More recently in Xian in Shaanxi Province, in Zengzhou and Xinxiang in Henan Province and in Yong County, Hengshui and Shenzhou in Hebei Province there has been progress in developing geo-thermal resources for heating; in Yong County alone there now is 150,000 square meters of living space for which geo-thermal heat is provided.

Regional Developments in China's Renewable Energy Industries

The clean technology industry has become the second most significant industry in Beijing's Zhongguancun District, increasing to 11% of total economic value in 2007 from 2.2% in 2001. In the first three quarters of 2007 total income generated by Zhongguancun's clean technology industry was 55.71 billion Yuan, a 55.6% increase y-o-y; profits generated by Zhongguancun's clean energy technology industry in the first three quarters of 2007 totaled 5.4 billion Yuan. There are reportedly nearly 2000 enterprises and organizations in the Zhongguancun District that are involved in clean technology and scientific research. Zhongguancun is home to 45% of China's key research labs, 33% of China's engineering research centers and 40% of China's engineering technology research centers.

According to reports in the Tianjin Daily, the city of Tianjin will again build 20 green energy conservation demonstration projects (buildings) in 2008.

Laws and Policies Governing Renewable Energy and Sustainable Development

The {Notice Concerning Adjusting the Consumption Tax Policy on a Portion of Refined Oil}, which was issued by the Ministry of Finance and the National Administration on Taxation in late February 2008, re-imposes a consumption tax on lubricating oil, solvents, naphtha at a rate of 0.2 Yuan/litre and on fuel oil at the rate of 0.1 Yuan/litre beginning from January 1, 2008. There is an exemption from the consumption tax on naphtha oil where it is used for the production of ethylene and

aromatic hydrocarbons; that exemption lasts until December 31, 2010. It is expected that the new tax will account for less than 1% of the price.

CDM Projects and Other Foreign Participation in China's Renewable Energy Sector

As of the end of February 2008 the executive board of the UNFCCC had registered a total of 161 Chinese CDM projects; in this same period there were a total of 912 alternative energy projects, which Chinese entities had registered with the National Development and Reform Commission. To date the registered Chinese CDM projects account for 17.04% of all registered CDM projects (by number of registered projects) and 49.23% of all registered CDM projects (by quantity of anticipated carbon dioxide reductions). Through February 13, 2008 the executive board of the UNFCCC has issued a total of 36,371,368 MT of certified emissions reduction credits with respect to Chinese projects; this level of CERs accounts for 31.33% of total CERs issued and now makes China's CERs the largest in the world, surpassing India for the first time. Since January 2008 the following nine projects have been registered with the executive board of the UNFCCC: 1) 10.2 MW Yangdun Small-Scale Hydropower Project; 2) Xiaoshuichi Hydropower Project located in Lanzhou City, Gansu Province; 3) the Wulabo 30 MW Wind-Farm Project located in Urumqi, Xinjiang Province; 4) the nitrogen dioxide decomposition project of the Liaoyang Petrochemical Co. (a subsidiary of PetroChina Co., Ltd.); 5) the Sichuan Province, Banzigou Small Hydropower Project; 6) the Shangbao Small Hydropower Project; 7) the Yuliangwan Small Hydroelectric Project located in Hunan Province; 8) the 8 MW Hydropower Project located in Dongxu, Qinghai Province; and 9) the Hubei Province, Yanzi Village Baishun Taohuashan Hydropower Project.

China's success in utilizing the Kyoto Protocol CDM regime is illustrated by the administrative infrastructure, which Hunan Province has put in place to facilitate CDM registrations. In November 2005, just nine months after the Kyoto Protocol went into effect, Hunan Province established the CDM Project Service Center under the auspices of the Hunan Province Science and Technology Office and with the support of the NDRC and the National Ministry of Science and Technology. In April 2006, Hunan Province established the Hunan Province Science Clean Development LLC, whose purpose was to give assistance to CDM project development. Presently, the service center has a total of 30 employees, 25 of which are under 30 years old and whose specialties include energy, the environment, climate, economics, finance and law; six of the service center's employees have English language skills (three of which are at the "eighth level" English proficiency). The Project Service Center and the Hunan Clean Development LLC have developed a total of 73 CDM projects, of which 39 projects have obtained the approval of the NDRC, 10 have been submitted to the executive board of the UNFCCC for registration and 3 projects have been registered with the executive board of the UNFCCCC. The Project Service Center and the Hunan Clean Development LLC also has entered into agreements with more than 20 countries (regions) with respect to CDM project development; these include Sweden, Switzerland, England, the U.S., Germany, Canada, Japan, Australia, Austria, Singapore and Taiwan. It is estimated that by 2012

the Hunan projects will have accounted for reductions in carbon dioxide emissions totaling 40 million MT and have produced carbon exchange contracts worth 3 billion Yuan.

Developments in Environmental Protection and Energy Conservation in China

According to the State Administration for Environmental Protection, in 2008 China will close another 13000 MW of small coal-fired power plants, 6 million tpy of outdated steel-making capacity, 50 million tpy of old cement production and 14 million tpy of backwards iron smelting capacity. In 2008 desulphurization equipment will be installed on a total of 30,000 MW of power plants and the goal is for sulfur dioxide emissions to decline 6% compared with 2005 levels. Despite having the goal of a 2%/year reduction in pollution emissions during the 11th Five Year Plan period, in 2006 sulfur dioxide emissions increased 1.5% (though the rate of increase was 11.6% less than the previous year); in the first three quarters of 2007 sulfur dioxide emissions declined 1.81% compared to the year before.

By 2010 the total output value of China's environmental protection industry will be ~880 billion Yuan, equal to ~3.4% of China's then GDP. With respect to energy conservation in buildings, it is estimated that before 2020 China will have to invest more than 1 trillion Yuan in upgrades to buildings; in Beijing alone during the 11th Five Year Plan period, upgrades to buildings will cost 8 billion Yuan.

According to a report issued by the Energy Bureau of the NDRC, the environmental pollution costs to China make up from 3%-7% of GDP.

On February 26, 2008 the State Administration for Environmental Protection issued the its 2008 list of products whose manufacture is characterized by "Heavy Pollution and Heavy Environmental Risk" (known as the "Two Heavies" list). In all the initial Two Heavies list includes a total of 141 products from six industries. The State Administration for Environmental Protection will be proposing that the VAT rebates that still exist for 39 of the products on the Two Heavies list, be abolished and that processing trade in these items also be prohibited.

China's Energy Production and Consumption

On January 10, 2008 the National Development and Reform Commission issued the {11th Five Year Plan for Energy Development}, which calls for a deepening of reforms in the coal, oil, natural gas and electric power industries. The {11th Five Year Plan for Energy Development} suggests that by 2010 the relative contribution to total energy resources of coal, oil, natural gas, nuclear power, hydropower and other renewable energy resources will be, respectively, 66.1%, 20.5%, 5.3%, 0.9%, 6.8% and 0.4%. The Plan also calls for non-renewable energy consumption to be capped at 2.7 billion MT of coal equivalent energy and for energy consumption per unit (10,000 Yuan) of GDP to decline to 0.98 MT of coal equivalent energy in 2010 from 1.22 MT of coal

equivalent energy consumption in 2005; in the 11th Five Year Plan period the average rate of energy conservation would be 4.4% or the equivalent of not depositing 8.4 million MT of sulfur dioxide and 360 million MT of carbon dioxide. An important aspect of the 11th Five Year Plan for Energy Development is the goal of rationalizing crude oil pricing, speeding up the rate of adjustment of natural gas prices and gradually improve the oil reserves system to increase China's energy security.

A report issued by the National Industry and Commerce Joint New Energy Business Association estimates that investment in China's new energy and renewable energy industries in 2007 totaled 76 billion Yuan (~$10.4 billion U.S.). Of that total an estimated 24 billion Yuan (~$3.28 billion U.S.) was invested in China's wind power industry; 24 billion Yuan (~$3.28 billion U.S.) was invested in China's hydropower industry; 6 billion Yuan (~$821 million U.S.) was invested in China's bio-energy industry; 10 billion Yuan (~$1.37 billion U.S.) was invested in methane gas development and 10 billion Yuan (~$1.37 billion U.S.) was invested in China's solar industry.

Through the end of the third quarter of 2007 the average debt to asset ratio within the electric power industry was 59.74%. In the third quarter of 2007 the average financial expenditure by the power industry as a percentage of their operating income was 5.34%, 0.83% higher than a year before. Analysts say that the rate of increase of profits in the electric power industry in the 2008-09 period is likely to be 20%-30% lower than what was anticipated previously because of the slow pace of increases in power prices which have been approved, given the increases in coal prices. According to another analyst, the profitability of the power industry is closely connected with the tandem movement of coal and power prices. The approach is for power prices to be adjusted every six months to the extent that coal prices have risen at least 5%. Since the beginning of 2008 coal prices have increased in excess of 10%, yet it is unlikely that an increase in power prices will be approved until the second half of 2008. In the May-June period of 2005 and 2006 the NDRC implemented the first and second coal/power tandem price increase and adjusted the on-grid power price and the final price of power, increasing the price of power a total of 0.0501 Yuan/Kwh.

By 2020, when China's total consumption of oil will be ~450 million tpy, it will rely on foreign sources of oil for 60% of its total oil requirements.

From the end of 2007 through mid-February 2008 the price of coal in China has risen by nearly 50%. This in turn has caused a near doubling of imports of coal in early 2008. For example, according to Chinese Customs Guanxi Province imported a total of 1.515 million MT of coal in January 2008 and Fujian's Province's coal imports in that same month totaled 406,000 MT, a 15.2% increase y-o-y.