The China Sustainable Energy Program
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Highlighting this issue, China adopted a renewable portfolio standard in the 10th Five-Year Plan, which requires the power sector to produce a minimum of 5.5 percent of its electricity from renewable sources. The State Economic and Trade Commission predicts China's renewable energy consumption will rise from 0.2 to 2 percent by 2015, reducing carbon dioxide emissions by 30 metric million tons per year. The State Development Planning Commission, the World Bank, and the Energy Foundation co-sponsored a major conference on power sector reform in China. In the transportation sector, the European Union (EU) committed $770,000 to assist China to control vehicle emissions at levels comparable to EU standards. China is also offering a more favorable consumption tax on vehicles that meet the Euro II vehicle emissions standard. Spurred by the prospect of hosting the 2008 Olympics, Beijing is determined to improve its air quality by forcing the retirement of old cars, converting to natural gas buses, encouraging natural gas as a residential fuel, and closing down heavily polluting enterprises. Part of this campaign will be funded by a $349 million World Bank loan.

What's Inside . . .

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Plans to Use More 'Green' Electricity

By GUO Nei, 2 September 2000

China is preparing to adopt a quota system [renewable portfolio standard] to promote the use of energy from renewable sources in the next Five-Year Plan (2001-05), according to an official with the State Development Planning Commission.

The new policy requires the power sector in each region to produce no less than 5.5 per cent of electricity from "green" sources, according to Zhou Huang of the commission,

Regions which cannot fulfill their quota will have to buy electricity from those with excessive "green" supplies until they are able to produce the minimum 5.5 per cent.

"With the help of these policy measures, the development of renewable energy will be promoted," said Zhou. "At the same time, poor regions which are often rich in renewable energy will gain money by selling power."

Commission statistics show currently wind power, solar energy, hydropower and other renewable energy resources account for 1.8 per cent of the total annual commercial energy used in China. They also show electricity produced from renewable sources accounts for 5.5 per cent of the total electricity produced annually.

Apart from its non-polluting nature, experts believe renewable energy will also provide new job opportunities and promote economic development in the less-developed regions of China.

Renewable Energy Consumption to Jump to 2 Percent

Centre for Environmentally Sound Technology Transfer Policy Digest, July 2000

The State Economic and Trade Commission (SETC) says the nation will decrease its use of alternative and renewable energy 10-fold within 15 years, easing the nation's dependence on coal. So by 2015, it's projected that 2 percent of China's total energy consumption will be from renewable sources.

Currently, wind power, solar energy, hydropower and other renewable energy sources account for 0.2 percent of the total annual commercial energy use in China. "Attaining the 2015 goal means that coal used in China will be cut by 60 million tons a year, which can reduce carbon dioxide emissions alone by 30 million tons," Bai Rongchun, a SETC director general, said in Beijing on 17 July.

Coal accounts for 72 percent of China's energy use. In 1999, China consumed 1.3 billion tons of coal, which is largely responsible for air pollution. With China being a signatory country of the United Nations Framework Convention on Climate Change, government officials have been working to readjust energy use, reduce greenhouse has emissions and protect [the] global environment by developing alternative and renewable energy sources.

Research on alternative energy sources has accelerated. Two-thirds of China enjoy 2,200 hours of sunlight every year—an average of six hours a day—representing a high potential to develop solar energy. Wind Power is another viable energy source. The country's wind power potential is estimated at 253 million kilowatts. In addition, geothermal energy reserves could exceed the equivalent of 200 billion tons of coal. Solar, wind and biomass energy are expected to become effective clean energy providers in China in this century.

China's energy supply and related equipment manufacturing industries are projected to annually generate business worth 67 billion yuan (US$8.1 billion) by 2015, when the energy sector will provide 500,000 jobs.

China Sets Wind Power Development Goals
Asia Pulse, 19 October 2000
China plans to install wind mills totaling 280 megawatts in 2000 and 1,192-megawatts by 2005, according to a study on wind power development for the Tenth Five-year Plan. Worked out by the State Power Corporation in line with China's realities, the report lays out guidelines and principles for wind power development. With policy support from the state, according to the report, China's installed wind power capacity may reach 2,500 megawatts by 2005.

SDPC Publishes Renewable Energy White Paper

U.S. Embassy, Beijing Environment, Science and Technology Update, 15 December 2000

The outlook for new and renewable energy resources in China is outlined in a hundred-page White Paper published by the State Development Planning Commission (SDPC) Basic Industries Department in April 2000. Energy sources such as wind, solar, geothermal, biomass, fuel cells, and hydrogen power, as well as various kinds of "seapower" using tidal flows, heat gradients and salt gradients, are examined.

China's current energy mix is 75% coal, 17% oil, 2% natural gas, and 7% primary electric power production (such as hydropower). These official energy-use statistics do not reflect the estimated 17% of actual energy supplied by the burning of straw and firewood.

In the White Paper, SDPC experts predict that even after taking full advantage of new technology and improved energy conservation practices, China's ability to supply energy from domestic sources will fall short of demand by about 8% in 2010 and 24% in 2040. Imports will have to make up the difference, so the possibility of a global rise in energy prices over the next decade also worries China's planners.

According to the White Paper, China's weaknesses include its lack of a clear renewable energy strategy, a lack of adequate incentives (such as favorable tax treatment and subsidies), inadequate investment in renewable energy, a lack of rationalization in the industry (for example 500 different companies make solar water heaters), and generally poor management and quality control. The paper reports that the governments of Denmark, Holland and the United States have pledged support in the form of grants and soft loans for new and renewable energy sources worth $2 billion over the next five years. (*China's New and Renewable Energy Sources*, China Planning Publishing House, April 2000)

Project to Tap Renewable Energy in Rural China

Centre for Environmentally Sound Technology Transfer Policy Digest, September 2000

After more than three years of preparation, China is implementing a program designed to turn solar and wind energy into electricity for people living in remote areas. The Inner Mongolia and Tibet autonomous regions and Gansu Province will pioneer the use of renewable energy in the country.

Wang Changgui, a leading member of the Brightness Project, said they plan to implement the project by having local planning commissions take charge of general operations and to establish special offices to carry out the work, including choosing products through public bidding. But the households in which the solar panels and windmills are to be installed will have to pay for the equipment. The central government has invested over 20 million yuan (US$2.4 million) to start the project. Most of the funds were used to establish necessary administrative services, scientific research and production.

The local governments of the Inner Mongolia Autonomous Region and Qinghai Province have taken the lead in subsidizing families willing to install solar equipment with 200 yuan (US$24) and 300 yuan (US$34) respectively. Other local governments are expected to adopt similar policies soon. Each set of equipment costs around 1,800 yuan (US$217); families still have to pay the remaining 1,500 yuan (US$180) to 1,600 yuan (US$193) not covered by the subsidies. The solar cells must be replaced every five years, costing another 500 to 600 yuan (US$60 to US$72) each time.

Although the prices are reasonable, they might still be an obstacle inp opularising solar equipment. The progress of the work will depend tremendously on publicizing the benefits of the equipment.

The project is also seeking ways to reduce the cost of solar energy systems. A large production base of solar cells, modules and application systems is bein built in Baoding of Hebei Province. It will, for the first time in the country, produce polycrystalline silicon cells, the cost of which will be much lower due tpo large-scale production. When finished the yearly output volume of the new base is expected to double that of the other eight in china. At present, the solar energy systems designed for the regions are able to produce 20 watts each.

China's Brightness Project was launched by the Chinese Government in 1996 as an immediate response to the call of the World Solar Energy conference. It vows to provide power for 8 million people by the year 2005, and 23 million by 2010 by harnessing solar and wind energy.

China Funded for Wind Power Development

WASHINGTON, DC, November 29, 2000 (ENS) - The Global Environment Facility has agreed to help the world's third largest energy consumer to harness wind power and reduce greenhouse gas emissions into the atmosphere.

The People's Republic of China (PRC) received approval of a GEF grant of $12 million for a $98 million project during the November meeting of the Global Environment Facility's (GEF) governing Council. The remaining funds will be provided by the Asian Development Bank, and provincial power companies and banks in China.

Jointly implemented by the World Bank, United Nations Environment Programme (UNEP) and United Nations Development Programme (UNDP), the GEF is an independent multilateral financial mechanism helping developing countries protect the global environment.

The project supports efforts by China to diversify its energy sources and reduce its dependence on coal, which accounts for nearly 72 percent of total commercial energy production and contributes significantly to the high level of carbon emissions.
As China's economic growth of the past two decades continues, demand for energy is expected to increase at a rate of four to five percent annually through 2015. At this rate, China could be the world's largest energy consumer and greenhouse gas emitter by the year 2025, Chinese government officials predict.
"Heavy dependence on coal not only pollutes the atmosphere, it also has health and mortality consequences," noted GEF chairman and CEO Mohamed El-Ashry. "This project is a win-win for power generation and human health."

The GEF announcement comes just in time for a four day conference in Beijing on renewable energy that opened Tuesday. The China 2000 International Environment, Renewables and Energy Efficiency Exhibition and Conference is sponsored by the State Economic and Trade Commission, the Ministry of Science and Technology, the State Environmental Protection Administration, the State Power Corporation and the China Aviation Industry Corporation. The government of China says in a document prepared for the conference that it "recognizes these challenges and the need to pursue aggressive programs to support environmental and social concerns while maintaining economic and energy development." Key programs include deployment of energy efficient and renewable energy technologies to reduce reliance on coal and provision of energy to the estimated 60 million habitants who live in remote, rural areas and islands which lack access to an electricity grid.

The GEF project will accelerate the large scale development and commercialization of wind powered electricity connected to the public grid. It will increase by 78 megawatts the electrical capacity provided by wind power through the construction of three wind farms at Dabancheng in the Xinjiang Autonomous Region, at Fujin in Heilongjiang Province, and at Xiwaizi in Liaoning Province.
More than 200 wind power turbines are already in operation in Dabancheng located in the northwest of China. The generating capacity of the center makes up one-third of the total installed wind power capacity in the country.

The project is expected to remove policy, information and institutional barriers to wind power development and promote private sector investment. The GEF intends the funding to contribute to the creation of a firmer market for the supply of wind turbines and help make the transfer of wind turbine assembly and manufacturing operations to China more economical. This project illustrates the new partnerships emerging in the GEF. It was identified and developed by the Asian Development Bank in collaboration with the United Nations Development Programme. The Asian Development Bank will have major responsibility for executing the project.

The GEF is offering an innovative mechanism for financial support. Of the $12 million contributed to the project out of GEF's coffers, half comes in the form of a grant. The other $6 million will be an interest free contingent loan. This loan will be repaid if the wind farms are successful, but will be converted into a grant if they are not. This approach allows GEF to help bear the perceived risks associated with wind farms while helping to build confidence in the new technology.

Success in these three areas is expected to lead to replication in other parts of the country. Parts of China have a rich wind resource base and some wind farm sites boast world class resources. However, present installed capacity is only about 265 megawatts, which is a fraction of one percent of the known wind power potential.

Overall estimates for new Chinese wind power capacity between now and 2010 vary from 1,000 megawatts to over 5,000 megawatts.

A 660-kilowatt wind farm using 40% Chinese-made equipment has gone into operation in Liaoning Province. Windpower is one of the Chinese government's strategies to bring electric power to 80 million Chinese living in border regions. (*S&T Daily*, September 21, 2000)

China's Largest Wind-Power Generator to Blow into Xinjiang

(7 December 2000) China's largest wind-power generator in China, funded by the loan from the Asia Development Bank, is expected to be set up soon in Xinjiang Uygur Autonomous Region.

According to the China Electricity Council, Xinjiang Power Co.'s "Feasibility Study on the Establishment of the Third Dabancheng Wind Power Plant Funded by the Asia Development Bank Loan" has been inspected and approved by government authorities. The installationís generating capacity is expected to hit 200,000 kilowatts, ranking first in Chinaís wind-power electricity industry, reported Zhongguo Xinwen She (China News Service) on Dec. 4.

Dabancheng area is in the center of the trunk electricity grid of Urumchi, the capital of Xinjiang. Xinjiang Wind Power Co., which was set up after a series of corporate mergers and acquisitions, has 111 generating units with a combined capacity of 57,500 kilowatts. Another 61 generation units, with a combined capacity of 31,500 kilowatts, are expected to start operation by mid-2001.

A total of 290.15 million renminbi (US$35.08 million) is expected to be poured into the first phase of the proposed wind-power plant while 600 kilowatts single-generation units will be installed. After the first phase is completed, generation capacity will reach 30,000 kilowatts, the article said.

After finishing the project, an annual 100 million kilowatt-hours of electricity will be transmitted through the Urumchi electricity grid, which is expected to save 4 million tons of coal and decrease soot and ash discharge by 65 million tons annually, the article said.

Nation Looks to Alternative Energy

By ZHAO Huanxin, 29 November 2000

China's drive to commercialize the development and utilization of renewable energy resources is expected to gather steam in the years ahead, according to officials attending the China International Environment, Renewable Energy and Energy Efficiency Conference.

Shi Dinghuan, a division director of the Ministry of Science and Technology, said yesterday that the country has developed a market-orientated programme designed to increase the percentage of renewable energy in the country's energy consumption structure.

Shi said the country is bent on reducing reliance on dwindling fossil fuels and pursing sustainable energy development.

According to a timetable created by the State Economic and Trade Commission, wind power, solar energy, hydropower and other renewable and new energy resources will account for 0.7 per cent of the total annual commercial energy used in China by the end of 2005, and 2 per cent by 2015.

The country's wind power capacity is expected to reach 1.5 million kilowatts by the end of 2005, with the use of other renewable energy resources, such as solar, biogas and hydropower, projected to reach or exceed the global average, Shi claimed.

In addition to utilizing renewable energy, China has deployed a multitude of energy-saving means to save energy. These efforts have led to a reduction in consumption equal to 834 million tons of coal over the past 20 years, noted Zhao Jiarong, a division director of the State Economic and Trade Commission.

In the coming five years, China plans to save energy equivalent to at least 300 million tons of coal, according to Chen Heping of the State Development Planning Commission.

Accompanying yesterday's conference was an exhibition in the China International Exhibition Centre, which showcased leading renewable energy technologies and equipment from China, the Netherlands, Denmark, Britain and Canada.

Speaking at the show's opening ceremony, Kerstin Leitner, representing the United Nations Development Programme, said that in order to promote the adoption of renewable energy in China, strong driving forces have to come from both the government and the private sector.

Leitner added that, in order to support the commercialization of renewable energy, the government has to initiate clear and firm policies in favour of renewable energy, and the private sector needs to develop its capacity to fully take advantage of renewable energy.

Beijing Will Explore New Energy Resources

Xinhua News Agency, 1 December 2000

Beijing is expected to improve its energy consumption structure by exploring new energy resources such as geothermal power, solar energy, bio-energy and wind power to reduce the use of traditional energy resource like coal, gas and oil.

The exploration of new energy resources will also benefit Beijing's goal to win the bid for 2008 Olympic Games, said Sinoprojects.com, the leading website on investment projects in China.

The consumption of the traditional energy sources has resulted in huge amount of pollutant discharge into the city's air whereas the upgrading of the city's energy consumption structure will improve the air quality of Beijing, Sinoprojects quoted an analysis of current resource reserve by the State Development Planning Commission.

According to the analysis, China's coal, oil, gas and hydropower reserve will be running out within one century. However, it noted, Beijing boasts potential renewable resources reserves, which will help the city use more clean energy resources while reduce the consumption of traditional energy resources.

Beijing has 150 geothermal wells, capable of producing 8.8 million cubic meters of hot water annually. About 400,000 cubic meters of the resource can be used for heating. If Beijing accelerates the exploration of its geothermal resource, the new power will solve heating problem for about 20-30 million square meters of area, equivalent to the consumption of 3 million tons of coal.

The city also claims abundant solar energy resource. The average annual sunlight-covering time of the city is about 2,594 hours. The solar energy resource could be widely introduced to electricity generating and heating.

Beijing is capable of becoming the world's largest solar energy consumption city.

The city's agriculture sector produces 5.2 million tons of crop stems annually, 4.17 million tons of which capable of being generated into energy. But only 1.56 million tons of the total resources are generated into energy. Another major bio-energy choice is the city's rubbish, which amounts to 4.7 million tons annually. If half of the rubbish are burned to generate electricity, about 340,000 tons of coal will be saved.

The last choice for new energy resource falls to wind power. Yanqing County in northwestern suburbs of Beijing is capable of greatly tapping he wind power. By installing 100,000-kw electricity generating units, the annual electricity generating capacity is to reach 175 million kwh.

The new resources will help provide a new energy supply equivalent to 6.48 million tons of coal and the discharge of pollutants will drop 640, 000 tons.

According to the analysis of the commission, Beijing needs a construction fund about 800 million yuan to tap the potential new resources.

Wind Power Out of Breath?

U.S. Embassy Beijing Environment, Science and Technology Update, 27 October, 2000

China's wind-generated electric power capacity has grown by 60% annually during the 1990's. To date, China has 2.2 billion kilowatts of potential windpower reserves located 10 meters or more above the ground but the fraction of this that is the practically exploitable wind resource base comes to 253 million kilowatts. Foreign grants and low-interest loans have supported growth to date, but cannot support continued exploitation of China's abundant wind resources at the same rate of growth over the next decade, according to New Energy Sources magazine. Thus more Chinese government incentives are needed. Also, more durable equipment is required, since windmills that last only ten years cannot be used to secure long-term financing.

China Seeks International Bidders for Wind Project

(ChinaOnline, 20 December 2000) China's State Development Planning Commission (SDPC) is welcoming international bidding for the 100,000-kilowatt wind-power generators construction during the 10th Five-Year Plan. The bid winners are required to establish the wind-power generation plants with a capacity no less than 100,000 kilowatts within five years, reported the Dec. 14 Zhongguo Shuili Bao (China Water Conservancy News). The bidding will include the development rights for wind-power resources and the operational rights of the generators, which will be in the form of joint ventures or wholly owned foreign firms. It would also include the rights to sign long-term electricity supply contracts with local coordination authorities. In addition, the SDPC and other relevant government authorities are expected to roll out policies that may drum up foreign investment, such as cuts or exemptions on import tariffs, value-added tax and income tax, the article noted.

Power Sector to Restructure

Generation and distribution to take separate paths

By Jing Ji, 10 October 2000

China's electric power sector should speed up efforts to separate its power generating plants from transmission grids, experts said.

The separation of generation and transmission is an integral part of the sector's restructuring, they said.

"Generating companies should completely separate from power transmission and distribution," said Peter Egger, a senior expert from the World Bank.

The separation is a prerequisite for the power sector before it can establish competitive power markets in China, Egger said at the Workshop on Competitive Power Markets for China, which opened yesterday in Beijing.

The Chinese Government has also recognized that the separation is a pressing factor in improving the electric power markets and launching a new competitive pricing mechanism.

The separation was implemented in the first half of the year in Shanghai Municipality, Shandong, Zhejiang, Heilongjiang, Jilin and Liaoning provinces.

According to the separation rules, a province must have at least five independent power generating plants, each occupying no more than one-fifth of the province's total installed generating capacity.

Power generators must bid with each other for access to power transmission grids allowing the transmission companies to purchase comparatively low-priced electricity and sell it to consumers.

Consumers can therefore choose electricity suppliers and benefit from the separation.

Electricity prices in some localities, especially in rural areas, have consequently been reduced.

The State Council approved the plan to separate power generation from transmission and distribution in 1999.

Power production and distribution were formerly a single entity in China under the planned economy, which resulted in monopolies on power markets by some generators and thus higher prices.

The separation is also expected to spur power generators to cut production costs and lower electricity prices to maintain market share, experts said at the two-day workshop.

The workshop is co-sponsored by the State Development Planning Commission and the World Bank and Energy Foundation.

China to Restructure During 10th Five-Year Plan to Meet Power Needs

(28 December 2000) China's demand for electricity is expected to increase by 5 percent to 6 percent annually during the coming 10th Five-Year Plan (2001 to 2005) and exceed 1,650 billion kilowatt hours in 2005 is cause for the State Power Corp. of China (SP) to adjust the electric power sector in the next five years.

According to sources at the SP, the total nationwide installation capacity is expected to reach 314 million kilowatts by the end of this year, while total generating output should reach 1,300 billion kilowatt hours. China ranks second in the world in these categories, the story said.

However, the unreasonable pricing system, unbalanced geographical development, and low-level high-tech development all underline the irrational industrial structure of China's power sector, the Dec. 24 *Zhongguo Jingji Shibao* (China Economic Times) reported.

Taking steps to adjust the structure

Thus, SP has decided to concentrate on adjusting the electrical industrial structure during the 10th Five-Year Plan.

The first step is to greatly develop the hydropower sector. By 2015, the proportion of hydropower stations is expected to increase significantly from the present 23.5 percent.

The second step is to rationalize the thermal power sector. Authorities are required to concentrate on constructing thermal power plants with single-generation capacity in excess of 300,000 kilowatts. Small thermal power plants are expected to be shut down, the article said.

Power plants will be encouraged to develop clean coal-based generating technologies, and pilot clean coal-based generation projects are expected to be given priority in construction. Meanwhile, nuclear power plants should be properly developed, and the process of nuclear power localization should be accelerated.

Power grid construction is expected to account for 40 percent of all power investment during the 10th Five-Year Plan. The distribution of local power grids and the backbone grids should be in line with the distribution of the power supply units.

Authorities are also required to promote the nationwide interconnection of power grids, in an effort to realize the initial interconnection between domestic regions. This would create a power market under unified central coordination.

In addition, SP is to speed up the west-to-east power transmission program. The proposed new power generation will be constructed in 12 provinces, cities and prefectures (a prefecture is an administrative unit smaller than a province but larger than a county) in western China, and will have a capacity reaching 29.2 million kilowatts, accounting for 37.4 percent of power generation nationwide. The figure includes 14.84 million kilowatts of hydropower, or 59.7 percent of the total nationwide.

The combined installation capacity in western China is projected to reach 98.17 kilowatts by 2005, or 26.9 percent of the total nationwide, up 1.4 percent from 2000. The annual growth of installation capacity in western China is expected to reach 4.2 percent, 1.1 percent higher than the national average, the article said.

Feeding the "Electric Tiger"

U.S. Embassy, Beijing Environment, Science and Technology Update, 27 October 2000

Chinese farmers often complain about excessive charges for electricity levied by their local "electric tiger" (dian laohu). In Guangdong Province, electric power charges are 50% higher in the countryside than in the city, and the Guangdong provincial government reports that Guangdong power companies take in one billion RMB ($120 million) in illegal charges annually, in violation of national and provincial government rules. Some Chinese experts say the State Development Planning Commission's estimate of RMB 2.74 billion ($334 million) in illegal power charges each year is too low. But not all these funds stay in the provinces -- every year Chinese electric power companies remit RMB 8.6 billion RMB ($1 billion) to the central government in Beijing.

Some energy-consuming companies have set up their own power plants, but others face stiff opposition from provincial power companies when they try to follow suit. New regulations to create independent power producers (IPP's) are reportedly under consideration. (ChinaInfo, October 19)

In Shanghai, Coal is Out, Natural Gas is In

(24 August 2000) In an effort to promote natural-gas power in Shanghai, the municipality is preparing a slew of measures to phase out local coal consumption.

Shanghai will stop building coal-burning power plants and coal-to-gas generators, reduce the use of coal-burning equipment, speed up construction of natural-gas powered electrical stations, establish no-coal-use areas and increase the number of households using natural gas, according to a conference the Shanghai Municipal Government held on Aug. 9.

Presently, Shanghai consumes more than 42 million tons of coal every year, meaning that coal accounts for about 70 percent of the city's energy source, reported the Aug. 15 issue of the *Zhongguo Meitan Bao* (China Coal Mining News).

Shanghai will no longer build new coal-powered electrical plants but instead will control coal consumption, promote technologies for using clean coal, speed up the construction of natural-gas pipelines, and complete a natural-gas pipeline network within the 10th Five-Year Plan.

The city will also strive to build natural-gas-powered electricity-generating plants and expand the use of natural gas for industrial and transportation purposes. The city will set a goal to annually consume of 3 billion cubic meters of natural gas by the year 2005, the story said.

A Push for Energy Efficiency

(8 August 2000) With the support of government policy, energy-saving projects will become a focus for investment in China, according to the Aug. 3 *Zhongguo Zhengquan Bao* (China Securities).

China's current level of energy efficiency is low. It is only equivalent to the level reached in the 1950s in developed countries, according to Zuo Liming, director of the Center for Energy-saving Information Dissemination (CESID) under the State Economic and Trade Commission (SETC). The per-product energy consumption of the Chinese industry is far above that of the advanced countries.

For example, one ton of steel produced in China consumes twice as much energy as steel produced in the United States and three times more than in Japan. The per-product energy consumption by less advanced Chinese companies is four times the consumption of the most advanced companies.

Investment in the renovation of these inefficient enterprises, therefore, will see significant returns, the article noted.

China's iron and steel sector, for example, saved 9.7 billion renminbi (US$1.17 billion) by reducing energy consumption between 1995 and 1999.

China set up CESID under SETC in 1999. In the next five years, the center will research and develop 100 mature technologies with good application potential in the areas of energy management, industrial boilers, steam pipeline networks, electric motor speed adjustment, and architecture energy conservation. During the same period, the center also plans to compile 20 energy saving technology guidelines for these sectors, the story said.

Air Conditioners to be Quieter, More Efficient

Centre for Environmentally Sound Technology Transfer Policy Digest, May 2000

China's air conditioner manufacturers agreed that top priority should be given to producing products that are energy saving, quiet and environmentally friendly, representatives from about 60 air conditioner manufacturers met in Beijing in late May in an attempt to smooth out wrinkles in the industry standards in an effort to set them on the right track with China's pending WTO entry.

The conference was organized by the China Air Conditioner Manufacturing Industry Association and the China Environmental Labelling Committee (CELC). Officials from the industry's administrative departments—the State Environmental Protection Administration (SEPA) and the State Administration of Machinery Industry (SAMI)—also attended the conference.

The organizers and environmental officials urged all air conditioner manufactures to meet environmental standards set by CELC, the official agency that supervises the labeling for environmentally friendly products. The government is considering what preferential policies should be given to market products with CELC certificates. SEPA is considering formulating a regulation on this respect.

However, despite the booming air conditioner market, many consumers still doubt if the so-called green air conditioners are as good as they claim to be. A survey in China's six largest cities late last year indicated that more than 60 percent of the consumers thought the claims of so-called green air conditioners were overstated.

World Banks Helps save Money and Energy

Centre for Environmentally Sound Technology Transfer Policy Digest, September 2000

China is joining hands with the World Bank to develop a project for the sustainable development of the energy-saving industry. The State Economic and Trade Commission (SETC) reached a consensus with the World Bank to accelerate China's efforts in seeking a new energy-saving mechanism through an energy-saving and promoting programme.

The programme, which will use funds and technology from the World Bank and Global Environment Facility (GEF), is aimed at introducing a new way of financing energy-saving projects in China, and demonstrating and popularizing their effects.

Officials with the SETC are confident that such a programme can establish a new energy-saving market-oriented mechanism, improving the efficiency of energy-saving projects, monitoring increases in the emission of greenhouse gases and protecting the global environment.

Under such a programme, a variety of Energy Management Corporations (EMC) that use expenses they save from energy-efficient projects to pay for the cost of new projects, are expected to boom throughout China. The EMC is designed to provide various services to enable enterprises to adopt energy-saving technologies and corresponding management.

Under China's planned economy, popularizing the energy saving concept used to be the job of a trinity of departments: the government, agencies responsible for energy-saving services and the management departments of energy-saving enterprises. However, with the shrinking of the government's administrative hold over energy-saving efforts and the State's limited funds for the purpose (of energy saving), the vitality and efficiency of the management system are deteriorating.

China has, since 1996, set up three joint-stock EMCs for energy saving projects in Beijing Municipality, Liaoning and Shandong provinces. To date, EMCs have succeeded in bringing 107 energy-saving projects into effect in the fields of boilers, electrical engineering and heating power-supplies for real-estate, with some 160 million yuan (US$19.3 million) of investment.

Experts with the commission made it clear that "industrialization of China's energy-saving efforts can be realized under the EMC model with its advantages of financing and technology capabilities."

An Agenda for No-Smog Vehicles

Sinosphere, Spring 2000

The Chinese Government has committed to speeding up the development and use of clean-fuel vehicles to ease air pollution and keep the auto industry on track. This commitment was announced at a Sino-UK automotive seminar called "Practical Steps to Cleaner Vehicles" in Beijing. The government has a list of ideas to contain pollution and improve China's 15 million motorized vehicles. One measure is the central government requirement that all vehicles meet a European emission standard by the end of this year, said Zhou Jianping, director of the Industry Management Department of the State Administration of Machinery Industry. China's cars, trucks and buses will be expected to meet another European standard by around 2005. According to a government clean vehicle programme, new oil-powered vehicles will be equipped with electronic injection technology, said Zhang Zhiwen, deputy director of the National Clean Automobile Work Team. The team is led by the Ministry of Science and Technology. The central government also banned leaded gasoline production at the beginning of the year. Starting in July, the government will promote the use of unleaded gasoline. The government also advocates using natural gas-powered vehicles, which are gaining popularity now in Beijing, Shanghai, Tianjin and Chongqing.

China's four leading vehicle makers, First Automotive Corp, the Dongfeng Motor (Group) Corporation, Shanghai Automotive Industry Corporation and Tianjin Automotive Industry Corporation have been designated production centres for natural gas-powered vehicles. Also, gas stations will be equipped so that people can pump natural gas into their cars. And the first domestically designed electric vehicle will emerge in October, Zhang said.

"The government encourages research and development of electric and hybrid-powered vehicles," Zhang said. Zhang added that more vehicles would be retrofitted to become more environmentally friendly. Zhou Jianping of the Industry Management Department said the government is making efforts to protect the environment and develop the country's automobile industry. "We will draw on experiences in the clean vehicle programme from developed countries such as Britain," Zhang said. Britain will do more to help China develop clean vehicles, an official with the UK Department of Trade and Industry said at the seminar. That department co-sponsored the seminar along with the British Society of Motor Manufacturers and Traders and the Chinese administration, to enhance vehicle-emission co-operation between the two countries.

EU-Sino Project to Reduce Vehicle Emissions

By JIANG Chen, 10 November 2000

The European Union committed some 900,000 euros (US$770,000) to an environmental project aimed at reducing China's vehicle emissions.

Representatives from China and the EU officially launched the project to assist China in developing legislation, inspections, maintenance requirements and the facilities to control vehicle emissions at standards comparable to the strict rules on vehicle emissions in the EU.

It includes the following five sub-projects:

- Regulations for new vehicles and fuel quality;
- Regulations for the inspection and maintenance of in-use vehicles;
- Emission laboratory quality control;
- The establishment of a national database for vehicle emissions and fuels;
- Economic measures in emission control.

The project is the first in which the EU has entrusted the management completely to a purely Chinese body, instead of charging a commercial contractor with the job.

This highlights the drive to decentralize EU project management and increase ownership by the Chinese side, said Endymion Wilkinson, ambassador of the EU Commission Delegation to China.

"The EU supports China's attempts to prepare for a clean auto industry, which now has become one of China's pillar industries" he said.

It also underlines the administrative skills of the State Environmental Protection Administration (SEPA) to handle international co-operation projects efficiently.

The EU is making efforts to share with China its advanced experiences in vehicle emission reduction, he said, adding that China's environmental experts will be sent to Europe to learn from their counterparts.

Wang Jirong, vice-minister of SEPA, said the administration is actively seeking more co-operation with the EU in environmental management and technology.

The project is based on a recent World Bank assessment of China's environmental needs.

China has over 40 million vehicles, and the number is growing by 10 per cent yearly.

China and European Union Jointly Control Motor Vehicle Emissions
Environmental health & safety Review, November 2000
Sino-European joint control of motor vehicles emissions has been put into overall practice. Experts in the environmental sector from China and European Union will work together to prevent and control environmental pollution from motor vehicles in China. At present China has 40 million automobiles – a number which increases by 10% every year. The pollution caused by motor vehicles is threatening air quality. The European Union has provided China with 840,000 Euro dollars for a study covering five aspects concerning the control of vehicle emissions.

Consumption Tax Cut on Environmentally Friendly Autos by 30%

(20 July 2000) China recently reduced its consumption tax on qualifying environmentally friendly automobiles by 30 percent.

The Ministry of Finance (MOF) and the State Administration of Taxation (SAT) jointly issued a "Notice on the Reduction of the Consumption Tax for Low-Emission Automobiles." This measure details cuts in the consumption tax on the production and sale of small automobiles that meet China's emission standards.

According to the notice, China adopted a 30-percent reduction in its consumption tax, effective Jan. 1, 2000, on producing and selling sedans, sports utility vehicles and minibuses that meet low-pollution standards. These standards are equal to Europe's number two pollution standard, which are the stricter ones of the mid-1990s, the July 18 *Zhongguo Shuiwu Bao* (China Tax News) reported.

The notice also says that autos will receive these tax reductions only after passing the quality tests commonly recognized by the MOF, SAT, State Bureau of Machine-Building Industry and State Environment Protection Administration. In addition, auto manufacturers must submit low-emission test certifications and obtain satisfactory testing reports on their production of low-emission autos from the state authorities overseeing China's auto industry.

Since 1994, China has imposed consumption taxes of 3 percent, 5 percent and 8 percent on small autos, depending on their amount of emissions, with 3 percent and 5 percent being the most common.

China currently has two environmental-protection standards for small autos: the state compulsory standards, which are equivalent to Europe's standard in the 1980s, and the Beijing municipal standard, which was adopted this year and is equivalent to the European number one standard of the early 1990s.

Currently, few Chinese automakers can meet the stricter European number two standards for emissions.

Booming China has Fewer Bikes on Road Ahead

By Edward Gargan, Seattle Times, 4 October 2000

BEIJING - As a dense gray gauze of pollution drapes itself over stands of freshly planted plane trees in a northern suburb on a workday morning, Zui Zhiyoung hurries from a breakfast of noodles in his small apartment to the stop for the Yuntong 101 bus.

Around him, hundreds of commuters trot from newly constructed apartment complexes to a web of stops where fleets of public and private buses screech to a stop during rush hour before hurtling off down the capital's thoroughfares, arrowing to the forests of office towers that have sprung up in the last decade.

Yet strangely absent from the morning's commute are the apparitions that have been a central feature of Chinese urban life for half a century: bicycles. Along with the Great Wall, the looming red crenelated parapets of the Forbidden City and chopsticks, in the Western imagination the tens of millions of black bicycles have been emblematic of what is China.

But now, in a land that has twice as many two-wheelers as the United States has people, the bicycle is beginning to fade, gradually but inexorably, from the streets of urban China, marking a small, although not insignificant, transformation of Chinese life.

"I take buses and taxis," said Zui, 23, a Web site designer. "I don't even know how to ride a bicycle."

On this particular morning, too often like others, Zui cannot find a seat on the jam-packed bus.

"It's all right," he said. "There's all kinds of people I like to watch while we ride. It's a little difficult to read, but I don't mind. At least the bus is air-conditioned."

Zui is among a rapidly mushrooming number of commuters who eschew pedaling to work. On some avenues the bike lanes are all but empty as automobiles, buses and trucks clot the roadways. Increasingly, young Chinese are not even bothering to learn to ride bikes, because growing wealth has unleashed a plethora of transportation choices, public and private.

With the crumbling of the old socialist state-owned industries and their adjoining housing complexes, displaced by private companies and the wildfire growth of private apartment blocks, commuting distances have grown dramatically. In Beijing, a city of 12.6 million people, there are more than 167,000 buses, both city-owned and private minibuses, along with 69,000 taxis.

Almost momentously, the day of the classic black, and staggeringly heavy, tank-like Flying Pigeon or Eternity bicycle that so bewitched Westerners who first visited China in the 1980s is ending rapidly. At Blue Island, a state-run department store, a saleswoman sneered at a rack of the dusty black behemoths. "Only foreigners buy those," she said dismissively, urging a customer toward a display of primary-colored mountain bikes.

So successful have Chinese manufacturers become - most are now in joint ventures with foreign bicycle companies - that of the 24 million bikes produced last year, 95 percent were exported.

Within China, this means that fewer people have been buying bikes in recent years. Now, for the first time in half a century, China has witnessed a decline in its bicycle population, according to an analysis of data from the State Statistical Bureau. From a high of 545.3 million bikes in 1995, China today has a mere 540 million.

CBUAutoEnews, 28 September 2000
General Motors China recently donated five motor vehicles to China's Ministry of Science and Technology in support of China's efforts to build environmental-friendly vehicles. The five vehicles, two EV1 electric powered cars and three S-10 electric pick-up trucks, will be used at the State Electric Automobile Experimental and Display Area in Shantou of Guangdong province. The area was built by the Ministry and Guangdong Provincial Commission of Science and is the first institution for the study of the economics, technology and social environment that may influence the use of electric vehicle.

CBUAutoEnews, 30 November 2000
The Beijing municipal government will encourage the use of low-emission diesel vehicles in the 5th phase of the city's campaign in the control of air pollution, which covers the period of November 2000 through March 2001. Within the metropolitan area, a new diesel vehicle which meets the European I or II emission standards will be permitted for registration for every scrapped diesel vehicle. But those that meet with higher emission standards will not be restricted for registration.

World Bank Loan to Improve Urban Transport in Xinjiang

Shanghai Daily, 21 December 2000

The World Bank (WB) Board of Executive Directors approved two loans totaling US$174 million to China on Wednesday, according to sources with the WB Beijing Office.

One loan, valued at US$100 million, will be used to improve urban transport in the city of Urumqi, capital of northwest China's Xinjiang Uygur Autonomous Region.

Measures to be taken include building more urban infrastructure, such as ring roads; improving pubic transport and area traffic management; enhancing vehicle emission control; and drafting landscaping programs.

The total project cost is estimated at US$270 million, with US$170 million coming from the Chinese government.

The other project -- "Water Conservation Project" -- aims to achieve efficient use of water resources and improve the water scarcity problem in China's Northern Plain.

Lots of Horsepower: 1 Million Chinese Families Plan to Buy Vehicles This year

(20 July 2000) A recent survey found almost 1 million Chinese families intend to buy some type of automobile this year.

The survey was carried out in 14 Chinese cities by the Beijing Meilande Information Co. in association with 13 other polling firms around the country.

In these 14 cities, 8 percent of the families surveyed already own automobiles. So far this year, the percentages of Chinese families intending to buy all types of vehicles have risen, except for the percentage of families eyeing the purchase of a medium-sized bus, for which there was a slight drop, the July 18 *Jinrong Shibao* (Financial News) reported.

Other findings of the survey were:

- Altogether, 3.4 percent of the families surveyed said they intend to buy a sedan with an engine size of one liter or less, up 2.4 percentage points from last year. The total number of such cars to be bought this year in China is expected to increase 240 percent.
- A little over 1 percent intend to buy a compact car, and the total number of these cars to be bought this year is expected to increase 83 percent.
- Of the families interviewed, 1 percent said they intend to buy a sedan with an engine larger than one liter. This figure is up 0.6 percentage points from last year. The total number of these cars to be bought this year is likely to increase 150 percent.
- Overall, 7 percent of families interviewed said they intend to buy at least one vehicle this year. If this figure is correct, residents of the 14 cities are considering buying nearly 1 million automobiles, totaling 60 billion renminbi (US$7.2 billion) in potential sales.

CBUAutoEnews, 16 November 2000
People's Daily reports that 32.1% Chinese city residents are considering of buying a car in the next five years, according to a survey recently conducted among 10,000 people in 20 large cities by the China Consumers Association. Of the total respondents in the survey 30.6% had driver's license. 32 of the total expressed an interest to buy a car this year, 111 said they would buy a car in 2001, 156 in 2002 and 70% by 2005. The report predicts that there will sharp rise in car purchase somewhere between 2005 and 2010.

The first choice of a car by potential buyers in China will be a domestic make, according to a recent survey conducted by the People's Daily. In terms of factors that affect people's decision in buying a car, 67.7% believe that price is the No. 1 factor. 59.3% emphasize aftersales services, 46.1% gas efficiency and 39.3% brand selection.

Beijing Sector to Replace 9,000 Vehicles; China Carmakers Smell a Deal

(27 July 2000) Beijing's taxi companies are set to replace many of their vehicles—and China's automakers, who will likely sell 9,000 new vehicles in the deal, stand to win big in the process.

First Auto Volkswagen recently signed an agreement to provide Beijing taxi companies with 3,000 Jettas. A few days later, Dongfeng Citroen General Manager Zhang Shiduan visited Beijing to hold talks with the capital's major taxi companies.

Altogether, Beijing has 67,000 taxis, 73 percent of which are Charades made by the Charade Automotive Co., 13 percent are Citroens, and the remainder are Jettas and Shanghai Volkswagen's Santanas, the July 26 *Shenghuo Shibao* (Life Times) reported.

To bolster its application to host the 2008 Summer Olympic Games, Beijing intends to improve the image of its taxis by imposing new standards on taxis.

Beijing's regulations require that the replacement taxis have electronic fuel-injection engines, as well as new catalytic converters able to process mixed fuels. The capital set this special new standard for taxis after it adopted the European No. 1 emission standard on Jan. 1, 1999.

To bolster its application to host the 2008 Summer Olympic Games, Beijing intends to improve the image of its taxis by imposing this new standard on taxis—which works against the Charade. Meanwhile, there are not yet Santana models that can use mixed fuels and that feature electronic fuel-injection engines. The Santana features a 1.8-liter engine size.

Citroen, which has a 1.4-liter engine, sold more than 6,500 taxis to Beijing companies last year and another 2,500 so far this year, the article said.

Whether First Auto Volkswagen, after already selling 3,000 Jettas as taxis this year, can increase that number depends on whether it can boost its sedan's fuel consumption and make a breakthrough in fuel technology improvements. The Jetta has a 1.6-liter engine size.

Most of the capital's taxi companies say they will replace their vehicles with something better than the Charade. Because Santana officials have not contacted taxi companies needing new cars, the companies' choice seems to be between the Citroen and Jetta.

Gas prices in Beijing are increasing every day. Also, hot weather has increased fuel consumption because drivers and passengers are using air conditioning, according to the article.

Taxi drivers now place great emphasis on saving energy, so the cars they drive must be both energy-efficient and environmentally friendly, the article said.

CBUAutoEnews, 14 September 2000
The Beijing Bus General Factory plans to produce 1,000 natural gas buses for the capital's public transportation system by the end of this year. By then Beijing will become world's leading city in the total number of CNG buses. The company last year made 300 such buses powered by Cummins CNG engines.

No Car Day in Chengdu
U.S. Embassy Beijing Environment, Science and Technology Update, 20 October 2000
In honor of the UN Habitat Conference, Chengdu on October 14 experimented with a "no car day," the first of its kind in China. Despite dispensations for taxis and buses, traffic fell 65%, and respirable particulates (PM-10) fell by one-third. The Beijing Morning Post on October 16 told its readers that Chengdu's "no car day" reminds Chinese people how much they suffer from the air pollution, noise and traffic accidents that motor vehicles have brought.

Automakers Urge China to Import Unleaded Gasoline

(31 August 2000) According to the Association of the Automotive Industry of China (AAIC), the mainland must import high-quality gasoline if it wishes to reduce air pollution in Beijing, Shanghai and Guangzhou.

The AAIC, which represents China's major automakers, appealed to the government to import foreign fuel shortly after the country's new national unleaded gasoline standards took effect on July 1.

The association also told the government that the quality of China's domestically refined fuel was lower than that of imported fuel and that no matter what technical renovations were carried out, the overall level of auto emissions could not meet the national standards, the Aug. 30 *Zhongguo Huagong Bao* (China Chemical Industry News) reported.

China's current emissions standard for lightweight vehicles is equivalent only to Europe's No. 1 standard, which Europe adopted in 1992. However, the quality of unleaded gasoline sold in China remains extremely deficient compared to the requirements of the No. 1 European standard, the article said.

It added that using Chinese unleaded gasoline makes it too hard to meet the emission levels of the European No. 1 standard. Furthermore, requiring vehicles in Beijing, Shanghai and Guangzhou to meet a standard even higher than that of the European No. 1 standard in the near future will almost certainly be unsuccessful, the story noted.

Experts say that new domestically made vehicles using domestically refined fuels can all meet the European No. 1 exhaust standard in trials. The experts added, however, that in 80,000-kilometer (50,000 miles) road tests, not only domestically made vehicles but also imported high-end vehicles could not meet this standard, even though all these imports easily complied with the emissions standard in 160,000-kilometer (100,000 mile) road tests in their home countries.

According to the experts, the problem is the fuel used. They concluded that low-quality fuel will cause an engine's efficiency to deteriorate quickly and an exhaust filter to lose its effectiveness, the story said.

China's Dual-Fuel Vehicles off to a Sputtering Start

(23 October 2000) With oil prices gushing, the dual-fuel vehicle that is, a car that can burn either gasoline or liquefied petroleum gas (LPG) would seem to be a safe, reliable and clean alternative for Chinese carmakers.

But a recent study by a Chinese environmental agency suggests that this highway to fuel-efficient heaven is not without its potholes.

China's dual-fuel vehicles may be fashionable, but they are also costly and environmentally unfriendly, according to the Clean Vehicle Leading Group of China (CVLGC), who attribute the cars' faults to underdeveloped energy-conversion technology, the Oct. 14 *Zhongguo Huagong Bao* (China Chemical Industry News) reported.

Propelled by the conventional wisdom that dual-fuel vehicles are energy-efficient and environmentally friendly, vehicle conversion has found an enormous presence in China practically overnight. Beijing, the model city for the introduction of LPG vehicles, presently has close to 20,000, and many more are being built all across the country.

But here's the big roadblock: LPG-powered vehicles are still in the experimental stage in China

A question of compatibility

The biggest problem is that China's vehicle-converting technology falls short of many relevant requirements. An ordinary gas-powered vehicle will lose between 5 percent and 10 percent of its power after conversion; those converted in China will lose much more.

Converted vehicles may also fail to meet environmental protection standards. Because gasoline and LPG have different engine requirements, LPG does not respond well to the engines and ignition systems of cars used to gasoline.

Converted vehicles are also subject to safety concerns. China still does not have a complete set of technical standards for LPG conversion technology with standards still undetermined for the manufacture of gas tanks, safety valves and their accessories, according to the article.

As of yet, there is no standard for the construction of gas stations or for the conversion of gasoline-powered vehicles to LPG-powered vehicles. In short, technical measurements for monitoring and controlling LPG vehicles are virtually nonexistent.

The one relevant government requirementóthat converting factories must be authorized by the original automakersóis frequently ignored.

According to the story, experts have suggested that the Chinese government take decisive measures to stop the chaotic rush toward dual-fuel vehicles. China must learn from Japanís experience and concentrate on improving infrastructure, building large natural gas stations, and pushing natural gas-powered automobiles.

Other alternatives considered

After the implementation of the gas tax, diesel will be cheaper than gasoline. Diesel has a higher burn ratio than gasoline and is therefore more economical. However, the article said, quality of Chinese diesel is substandard. China's present lack of technological resources will make it difficult to bring its diesel fuel up to standard in a few years.

Another possible option is to accelerate research on and development of other vehicle power technologies, such as electric or fuel-battery power.

Recently, a type of new automobile powered by light-liquefied hydrocarbon (LLH) has caught the automotive industry's attention. The vehicle has been piloted in Jinhua, and model LLH stations have been built there. LLH is a condensed liquid produced in oil fields, natural gas fields and purifying factories.

The liquid is a byproduct of oil refineries and ethylene factories, and ordinary gasoline vehicles need only an LLH-providing system to be converted.

Compared with LPG and natural gas, LLH is easy to transport, stock and fill. LLH-powered vehicles have a much lower emissions level than gas-powered vehicles. The cost of LLH is low, as is the cost of constructing LLH stations. All these advantages make it plausible that LLH will be promoted as an alternative fuel for automobiles, the story said.

CBUAutoEnews, 31 August 2000
More than 100 public buses were recently converted into dual fuel vehicles in Anshan in northeast Liaoning province in order to reduce pollution from tail emissions. The major city of steel and iron production plans to convert 300 buses into dual fuel by the end of the year. The dual fuel vehicle will reduce carbon monoxide by 90% and hydrocarbon by 50% to 70%.

At least 40 gasoline taxi cars have been been converted into propane driven vehicles each day in Shanghai. Now there are 16,000 propane taxi cars in Shanghai and the number is expected to increase to 25,000 by the end of the year. The recent price hike of gasoline is one of the reasons that have pushed forward the conversion process.

CBUAutoEnews, 24 August 2000
The city of Guangzhou plans to convert all of its city buses and taxis to using LPG by the year 2002.

Official Determined to Get China to Embrace Diesel Engines

(26 December 2000) While China has relatively few diesel engines, that's about to change. The country is embracing the use of diesel, according to the State Bureau of Machine-Building Industry.

In a recent address, Zhang Xiaoyu, the bureau's deputy director, said: "The proportion of diesel engines used on medium and light vehicles should be further increased, and diesel-powered sedans will be built and sold in the Chinese market," reported the Dec. 20 Zhongguo Qingnian Bao (China Youth Daily).

According to the article, diesel engines burn cleaner than petrol engines because they operate at much higher compressions. They also last longer than gas engines because diesel fuel is oily and helps lubricate internal parts.

Currently, diesel vehicles are not common in China and no passenger sedan is powered by diesel—a dearth that Zhang clearly intends to redress, the article stated.

"The state should adopt certain policies to support the development of modern diesel vehicles," he urged, "encourage enterprises to develop advanced diesel engines for vehicles and guide the public transit systems to purchase diesel-powered vehicles that have excellent exhaust levels."

China Revises Its Air Pollution Law

A June 2000 report from U.S. Embassy Beijing

Summary: China has adopted sweeping amendments to its air pollution control law with the intent to improve enforcement, address critical air quality problems in key urban areas and make broader use of market-based methods for cutting emissions. The changes take effect September 1. Penalties are stiffer, coverage is broader and lines of authority are clearer than under the current law. The amendments reflect a shift in strategy from controlling the concentration of pollutants from particular sources to controlling the total volume of pollutants entering an airshed. They also call for unspecified incentives for clean and renewable energy. According to the chairman of the committee that drafted the amendments, if the new provisions are faithfully implemented, by 2010 total pollutant emissions will be stabilized at 1995 levels, air quality in 34 of 47 key cities will meet national standards (up from 16 currently) and dust from construction sites in Beijing will be reduced 70 percent. The total cost, however, may top 1.5 percent of GDP in some areas. Additional environmental legislation is reportedly in the pipeline, including a new water pollution law, a clean production law, an environmental impact assessment law and a law to control desertification. Their success, as with past environmental laws, will depend importantly on enforcement and monitoring at the local level.

(For the full report, see http://www.usembassy-china.org.cn/english/sandt/Cleanairlaw.htm.)

China Moves to Clean Up Its Air Pollution

By Michael Dorgan, Knight Ridder News Service, 2 August 2000

BEIJING - Last year, there was one day when the air was clear and the breeze was fresh in China's capital.

It was Oct. 1, when the government shut down industries for the 50th anniversary of the founding of communist China so that Beijing's people could see the low-flying formations of fighter planes thunder over Tiananmen Square.

That was the only day in 1999 when Beijing's air qualified for the government's Level 1 rating. On one day out of four it reached Level 4, when even nonsmokers feel they have the lungs of the Marlboro Man, or Level 5, when it's so toxic that a few deep breaths can leave a person dizzy and nearby buildings seem lost in a filthy fog.

Clearer skies may be on the horizon. After years of denial and dithering, China's government seems to be getting serious about cleaning up some of the world's most polluted air, not only in the capital but in other cities as well. Spurred by its bid for the 2008 Olympics, the government recently has made strong commitments to clear the air.

The executive committee of the National People's Congress has approved sweeping amendments to the nation's 1987 Air Pollution Control Law. The revised law, to take effect Sept. 1, would restrict emissions and impose stiff penalties on violators - if it is enforced. China has long had and ignored many anti-pollution laws.

But even some longtime critics of the government's record on cleaning up the air sense a change in the wind.

"What I find most positive is that the central and municipal governments only accepted air pollution as a problem a few years ago. Until then, they did not take it seriously and would even say it was not a problem," said Liang Congjie, director of the Beijing-based Friends of Nature, one of the country's few independent environmental groups. "Now everybody admits it is a problem. And if they admit that it's a problem, they must solve it."

China's urban residents would welcome a solution.

In a World Health Organization air-quality study of 272 cities in 1998, China's cities ranked among the globe's most severely polluted.

By the Chinese government's own standards, two-thirds of the 338 Chinese cities for which air-quality data are available are polluted. Two-thirds of those are rated "moderately" - though still seriously - or heavily polluted.

Some of the foulest air hangs over the capital.

Before 1949, when the Communists won China's war of revolution, Beijing was a royal city of shops, teahouses, theaters, gardens and tree-shaded courtyard houses, but little industry. The capital offered every imaginable comfort and pleasure to the rich and privileged, while many of its citizens went hungry. By some estimates, about one-third of its population of about 1 million had no means of support.

In 1957, the government embarked upon an ambitious five-year plan to transform Beijing into a major industrial center. More than 700 factories were

built in the city the next year, and thousands more were added later.

Beijing became a leading Chinese producer of steel, petroleum products, chemicals, electronics and machinery, prospering under an ever-denser cloud of pollution. Much of its energy came from burning soft coal, which pumped tens of thousands of tons of dust and sulfur dioxide into the air.

Cleaning up Beijing's pollution will take years.

Yu Xiaoxuan, deputy director of the Beijing Environmental Protection Bureau, said the city's determination to meet the air quality requirements that would allow it to host the 2008 Olympics has greatly accelerated cleanup efforts.

Over the last year, he said, 2 million tons of coal have been replaced by natural gas, helping to decrease the discharge of sulfur dioxide by 15 percent.

Some of the improvements are being offset by the steady rise of auto traffic. In less than 10 years, Beijing has become choked with cars, trucks and buses.

The city has tried to reduce vehicle emissions by forcing old cars off the roads, requiring catalytic converters and converting half the bus fleet to natural gas, which burns cleaner than gasoline.

Within five years, all Beijing's 60,000 cabs are scheduled to run on natural gas. About 10,000 have been converted so far.

These measures have helped reduce Beijing's discharge of carbon monoxide by 9 percent since 1998 to the still-staggering quantity of 100,000 tons a year, city statistics show.

Beijing's legendary dust storms are another worry. For years, the municipality has been planting trees in the surrounding hills to hold back the dust. But in March and April, the yellow dust storms were the worst in 50 years, darkening the daylight hours and forcing most people to wear sunglasses to keep the grit out of their eyes.

The storms blew in from the northwest, where destructive farming practices and dwindling water supplies are turning poor, arid land into desert. On the industrial pollution front, the city announced last fall that hundreds of polluting industries would be banished to Beijing's outer periphery in five years.

Qu Geping, an environment expert in the legislature who is chairman of the committee that revised China's air pollution law, told a visiting American environmental delegation in May that China will need to spend $40 billion to meet its air quality standards in 46 key cities, including Beijing. Much of that money will need to come from the local governments, many of which still regard cleaning up the environment as a luxury they cannot afford.

ChinaOnline

Beijing's Crackdown on Air Pollution Continues

(7 November 2000) Beginning Nov. 1, if the air pollution index for Beijing passes the Level-Four mark for three consecutive days, the municipal government will order heavier polluters to stop or limit production, stated the article.

This move is part of 20 new measures that went into operation in Beijing on Nov. 1, announced Zhao Yixin, director of the Beijing Environmental Protection Bureau, reported the Oct. 31 Beijing Qingnian Bao (Beijing Youth Daily).

Capital Steel is expected to be the enterprise most impacted during this stage because it will have to reduce its steel output by 2 million tons, and their Iron Alloy Factory is on the list of enterprises to suspend production.

Also, random checks will be performed on the enterprises that have already achieved discharge standards, currently 99.2 percent of Beijing's 5,013 enterprises. Those receiving three warnings will be ordered to stop production, the article said.

Also, those already meeting the standards must further cut their emission of sulfur-dioxide, smog and industrial dusts, the article said.

Driving days limited

The government will permit cars to be driven only on certain days of the week. Exceptions will be granted to vehicles with Green Environmental Protection signs, which include cars that use condensed natural fuel or liquefied petroleum gas, and vehicles carrying out public security tasks.

Driving within Beijing's major highway, Fourth Ring Road, will be confined to odd- or even-number dates.

The Transportation Administration of the Municipal Public Bureau will mobilize all police to apprehend

vehicles emitting black or blue smoke. Possible punishments could be either license suspension or imposed deadline for resolution, the article said.

To confront the problem of pollution created by home heating, 5 million tons of low-sulfur coal are being promoted. Also, 3 million square meters (3.6 million square yards) of living space are to be converted to use electricity, and 1 million square meters (1.2 million square yards) have already been converted.

Experimental conversion of electrical heating for one-story homes will also start during this latest round of legislation. Zhao Yixin said that residents using electricity would be charged only the going price for a low-demand period, about 0.1 renminbi (US$0.012) per kilowatt/hour.

Zhao also said that in 1999, the municipal government invested Rmb 10.6 billion (US$1.28 billion) in the efforts to control air pollution. This was 4.75 percent of Beijing's gross domestic product and the sum of spending for the previous three or four years, the article noted.

Beijing Air Cleaner, Says NPC Committee

U.S. Embassy Beijing Environment, Science and Technology Update, 20 October 2000

A National People's Congress Environment and Resources Committee staff investigation has found that Beijing's sulfur dioxide pollution fell by as much as one-third from 1998 to 1999, while carbon monoxide emissions fell 4%. Beijing achieved these improvements even as several hundred thousand new motor vehicles hit the streets last year. During the first eight months of 2000, the Committee noted, sulfur dioxide and nitrogen dioxide emissions fell by 13% and 4%, respectively, compared with the same period in 1999.

The NPC group called on Beijing to continue to work on developing clean energy sources, and changing energy use patterns, in order to try to bring Beijing's still-dirty air up to standard. (Beijing Science and Technology Daily, October 13) Beijing citizens generally share the hope that the city's 2008 Olympic bid will induce concerted anti-pollution efforts.

At the same time, Tang Xiaoyan of the Chinese Academy of Engineering told the press on October 12 that China still suffers from very poor information on air quality, due to underdeveloped monitoring capability. This situation makes it harder to establish the scientific basis for new policies and regulations. Tang bemoaned the fact that even as they spend a lot of money on pollution control, few cities think to invest in the monitoring equipment that would greatly increase the effectiveness of their pollution-fighting efforts. (China Info <http://www.chinainfo.gov.cn> , October 13)

Olympics-Seeking Beijing Sees Blue Skies in World Bank Project

Associated Press, 15 November 2000

An anti-pollution project launched Wednesday aims to clean Beijing's air -- and could boost the Chinese capital's bid for the 2008 Olympic Games.

The $1.25 billion project, of which $349 million is being loaned by the World Bank, will help Beijing approach World Health Organization clean air standards for cities by 2006, bank officials said.

Currently, ``Beijing is one of the worst cities in terms of your health to live in,'' said Songsu Choi, a World Bank urban economist overseeing the project. But ``things will be completely different'' by the time the project is completed in 2006, he said.

For more than 60 days each winter, air in many parts of Beijing is even dirtier than China's standards for industrial areas, mainly because of coal-burning boilers used to heat housing blocks, office buildings and facilities such as hospitals, Choi said.

Under the anti-pollution project, more than 2,000 of the 5,000 to 6,000 medium-sized boilers scattered around Beijing will be converted to cleaner natural gas, he said. The project is expected to reduce annual coal consumption in Beijing by 2.4 million tons.

Another project will involve expanding Beijing's sewage system and treatment facilities.

Even with new treatment facilities to be completed within two months, only 40 percent of Beijing's wastewater will be treated. But the treatment rate will increase to 85 percent by time the project is completed, Choi said.

Chinese officials promoting Beijing's bid for the 2008 Olympic Games acknowledge that pollution is a major concern. The city has responded with programs to combat vehicle emissions, reduce coal usage, plant more trees and close down polluting factories.

Asked if Beijing's air in 2008 would be healthy for athletes, Choi replied: ``Definitely."

``Very few cities can reach the level of Sydney, I guess, but it might be as good as Paris," he said.

Paris is among the cities competing for the 2008 games, along with Beijing, Osaka, Toronto and Istanbul. The International Olympic Committee will pick the host city next July.

World Bank Approves Environmental Protection Loan

By Raymond Li,
South China Morning Post, 10 July 2000

The World Bank approved a US$349 million (HK$2.7 billion) loan scheme on Sunday to help Beijing implement its second phase of environmental protection, the Green Weekly has reported.

At the same time the Global Environment Fund is also offering Beijing US$25 million.

The second phase project will span from thisOctober to 2006. The project needs more than US$1.255 billion in total.

It includes replacing all existing coal-powered steam or hot water generators with gas-powered ones, promoting an energy-saving heat supply system and developing sewage water collection and treatment systems in a quarter of the city area.

Beijing's image has been badly hurt by environmental deterioration. In the process of industrialisation Beijing has created some polluters - among them Shougang, one of mainland's largest steel producers.

Vehicle pollution is also getting worse. There are currently 1.4 million motor vehicles on the capital's streets.

Last November for two consecutive weeks, about 11 million Beijing residents lived with a category 4 level on the air pollution index. Sulphur dioxide levels were five times higher than the standard set by World Heath Organisation.

Authorities are confident that upon the completion of the second phase of the project, residents will breathe less polluted air and drink cleaner water.

China Threatens to Shut Polluting Firms by Year-End

Reuters, 16 November 2000

BEIJING - China is threatening to shut down up to 16,600 firms if they fail to meet environmental standards by the end of the year, a State Environmental Protection Administration official said yesterday.

But the official said the environmental body had little power to enforce the standards and local governments were responsible for halting production at companies which failed to comply.

The central government frequently has problems getting local governments to carry out policy decisions, especially when companies they own, and collect crucial taxes from, are the targets.

"Governments will close those firms not meeting standards after December 31 according to the law and ask them to upgrade their equipment," the environment official said.

"Once they reach the standards, they can open again."

In 1996, the State Council, or cabinet, decided to give 238,000 firms producing industrial pollution four years to clean up their acts, the official said.

By the end of September, 93 percent had meet the standards, which cover sulphur dioxide emissions and other air pollution such as smoke and dust, as well as various types of water pollution, he said.

Some 17,925 of the firms were classified as "serious polluters", responsible for 65 percent of China's air pollution, the official said.

"Most of these firms are involved in heavy industry in the western part of the country, such as the metallurgical, coal and chemical industries," he said.

"China's west has long been regarded as a heavy industry base and most of the firms were established during the 1950s and 1960s. Their equipment is old-fashioned."

China put the air pollution standards into law on September 1, giving the government more teeth to punish violators, the official said.

Guangdong's Air Pollution: Improvement Needed

Excerpted from "Guangdong Environment: Some Progress, But Many Problems Remain," A December 2000 report from U.S. Consulate General Guangzhou

Urban air quality in Guangdong Province has been improving. The content of sulfur dioxide, nitrogen oxides, suspended particles and falling dust in the air dropped in 1999. However, except for Yangjiang, Maoming, Heyuan and Meizhou cities, the rest of the 17 prefecture-level cities in Guangdong are all located in the "Acid Rain Control Area" (areas with high acid rain levels) designated by the State Council. Around 63 percent of the province's total land area lies within the "Acid Rain Control Area". As much as90 percent of the rain falling in Guangzhou is acidic.

Despite the fact that each city in the province imposes controls on automobile emissions, increasing numbers of vehicles have aggravated the problem of automobile exhaust. The sale of leaded gasoline has been banned in the province's major cities, while 740 cement factories and other heavy polluters were ordered closed down last year. Last May, the Standing Committee of the Guangdong Provincial People's Congress passed regulations to forbid the sale of automobiles and automobile engines whose emissions exceed the provincial standard. However, the legacy of past neglect is still very much apparent: a recent survey of 12,000 5-7 year-olds in Guangzhou showed that 83 percent have elevated lead levels in their blood.

Guangdong's air pollution is also aggravated by the fact that its power plants use high sulfur-content coal, and that they usually lack desulfurization equipment. Most of the power plants are in the Pearl River Delta.

The provincial government's "Blue Sky Plan" aims at controlling acid rain by controlling the emission of industrial pollutants in stages between now and 2010. The Plan will be included in the provincial government's social and economic development program. To achieve those goals, Guangdong will no longer approve the construction of coal- or oil-fired power plants whose generating capacity is lower than 125 megawatts. It will also make the utilization of hydroelectric power and natural gas a priority. The Plan will need an investment of about RMB 5.7 billion (US$685 million).

The Guangzhou municipal government has also issued similar regulations to improve the city's air quality. Starting from June 2000, all gas stations in the city were required to put additives into their diesel fuel. The diesel fuel price also was raised by RMB 0.08-0.10 per liter. Those who fail to sell unleaded gas would face a fine of RMB 10,000 (US$1,200).

The Guangdong Environmental Protection Bureau has been cooperating with the Hong Kong authorities to study the fundamental factors that impact on the air quality in the Pearl River Delta. The two sides are also discussing the feasibility of adopting a unified automobile diesel fuel standard so as to reduce diesel pollution in the two areas as much as possible.

(For the full report, see http://www.usembassy-china.org.cn/english/sandt/Gdrepub-web.html.)

Benxi to Experiment with Emissions Trading

A June 2000 report from U.S. Embassy Beijing

Summary: Benxi, a heavily polluted industrial city in Northeast China's Liaoning province, is preparing to implement a city-wide emissions trading system modeled after the scheme applied to utilities in the United States. City officials expect to have the legal framework in place by July 2000. The trading system will apply to all industrial enterprises within the city and will cover sulfur dioxide, soot and industrial particulates. Important implementation details still need to be worked out. But the Benxi experiment shows China is moving forward with market-based pollution-control mechanisms.

An environment, science and technology officer from the U.S. Embassy in Beijing and an economic officer from the U.S. Consulate in Shenyang visited Benxi June 6 to learn about the city,s innovative plans for reducing industrial air pollution. They were accompanied by a visiting fellow from Renmin University's Institute of Environmental Economics, which has acted as a consultant for the project, in partnership with the U.S.-based Environmental Defense Fund (EDF now Environmental Defense). They met with city government leaders and the director and staff of the municipal Environmental Protection Bureau (EPB).

(For the full report, see http://www.usembassy-china.org.cn/english/sandt/Benxiweb.htm.)

China Energy and Carbon Scenarios Project

Sinosphere, Spring 2000

The Beijing Energy Efficiency Center (BECon) and the Lawrence Berkeley National Laboratory (LBNL) are undertaking a project to assist the Basic Infrastructure Department of the State Development Planning Commission (SDPC) to formulate Chinese government's 10th Five-Year Plan and Medium to Long Term Strategy for Energy Efficiency. The project will provide policy-makers with suggestions on methods and relevant analytical tools for plan formulation and with policy recommendations derived from detailed study and analysis of scenarios for future development.

Initial work, carried out by the Chinese team, developed baseline information for the project, included assessment of implementation and outcomes of past energy-efficiency policies and programs in China. Future work will focus on development of an integrated model and associated databases for scenario-based analysis of energy-efficiency policies. Scenarios will be developed using an end-use-oriented model, and will allow assessments of the energy, pollutant emissions, and cost-benefit impacts of energy-efficiency and renewable energy policy options. The Chinese team will make policy recommendations to the Chinese government, and publications for public distribution will be produced as well.

This project is supported by the China Sustainable Energy Program (web address: http://www.efchina.org/ch/index.cfm) established by the David and Lucille Packard Foundation and managed by the Energy Foundation, and by the Shell Foundation's Sustainable Energy Program. It was started in the spring of 1999, and is scheduled to be completed in spring of 2002.

For more information, contact Jonathan Sinton at jesinton@lbl.gov, or at the China Energy Group, Energy Analysis Department, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, MS 90-4000, Berkeley, CA 94720 (o: 510/486-7081 f: 510/486-6996 jesinton@lbl.gov).

Smoggy China Must Do More to Curb Global warming

By Lee Chyen Yee, Reuters, 10 November 2000

SHANGHAI - China has stepped up efforts to alleviate choking smog in its cities, but should do more to cut the emission of greenhouse gases, believed to be a key cause of global warming, according to officials and environmentalists.

Many of the world's countries are scheduled to meet next week in the Netherlands to hammer out ways to implement a 1997 treaty agreed in Kyoto, Japan that requires key industrialised nations to cut greenhouse emissions by an average five percent below 1990 levels by 2008-2012.

China, the world's most populous country, was described in Kyoto as one of the largest emitters of carbon dioxide, and Beijing is one of the world's most polluted cities.

Much of China's energy comes from coal-burning plants, which fill the urban skies with sulphurous smog, though power firms have been trying to clean up, partly because of efforts to boost Beijing's chances of hosting the Olympics in 2008.

"The period of economic liberalisation and opening in China over the last 20 years has seen a real improvement in China's energy efficiency," said Jim Harkness, director of the World Wide Fund for Nature in Beijing.

"The government is doing a lot and more needs to be done. Much of that has to do with improving the efficiency and cleanliness of coal technologies," Harkness said.

China has come under fire for slow progress on cleaning up its polluted urban air, but some experts said the country might not be entirely to blame.

"Most attacks on China in terms of emissions are in fact diversionary tactics by oil companies and Western goverments that are trying to duck their responsibility under the Kyoto protocol," Harkness said.

SHOULDERING THE BURDEN

Some critics have said Washington was out to scupper the Kyoto Protocol because of fears that it would give developing countries like China a competitive edge.

China says developing countries should not shoulder all the responsibility for cutting greenhouse gas emissions, and the meeting in the Hague should concentrate on giving poorer countries the tools to follow through on the Kyoto agreement.
"Discussions should not only focus on the Kyoto protocol, but also concentrate on getting developed

countries to transfer technology and provide funds...," the foreign ministry said in a statement.

Environmentalists said that considering China's resources it would be unrealistic to demand it stop relying on coal and industry officials said government regulations require all new power projects to include equipment for environmental protection.

But some Chinese firms like Jingneng Heat and Power Plant, and Guohua Beijing Heat and Power Plant are making an effort to improve their environmental record.

Jingneng provides power and heat in the western part of Beijing. In a bid to reduce emissions, the company plans to issue a tender for a 200 million yuan ($24 million) desulphurisation upgrade for one generator.

"We plan to cut sulphur dioxide emission by 10,000 tonnes a year when the renovation is completed in 2002," a Jingneng official said.

Guohua, one of the largest coal-burning firms with daily consumption of more than 3,000 tonnes of coal, said it too was working to clean up its act.

It said it has chosen low-sulphur coal and imported desulphurisation equipment from Germany.

Global Warming Evidence from the Roof of the World

Himalayan glacier cores drilled during a Sino-American trip to the southern part of the Qinghai-Tibet plateau show that the past decade was the warmest in the last millennium. A University of Ohio scientist declared that 42-meter ice core samples showed that the past century's samples had four times the ash and twice the chlorides of the previous 900 years. Not only was the latest decade the warmest, but the latest fifty years were also the warmest fifty-year period in the millennium. The core samples also bore witness to six severe droughts over the past 1,000 years caused by failure of the monsoon cycle. The most recent major drought, at the end of the 18th century, killed 600,000 people. (ChinaInfo <http://www.chinainfo.gov.cn/> , *China Science News*, September 19)

Japan, China Lament Climate Talks Failure

By James Poole with Aya Takada, Michael Byrnes, Reuters, 28 November 2000

SINGAPORE - Japan and China joined a chorus of disappointment among Asia nations yesterday over the failure of climate talks in the Hague to agree practical steps to curb global warming.

The only upbeat comment came from the Australian resources sector which said no agreement was better than a flawed one.

The collapse of the talks rubs salt in the wounds of low-lying Pacific atolls who say their survival is threatened by rising sea waters prompted by global warming.

"We regret that no pact was reached at the meeting", said an official at China's National Environmental Protection Bureau.

"We have our own principles, which were not reflected in conference documents. It was not surprising various sides could not reach agreement," said the official who participated in the meeting in the Netherlands.

China uses vast amounts of coal to generate energy and is one of the world's leading emitters of carbon dioxide, a greenhouse gas that scientists and environmentalists say contributes to the warming of the planet.

Japan's top government spokesman Yasuo Fukuda told a news conference that the failure to reach agreement in the Hague was "regrettable", expressing hopes that efforts to improve environmental problems will continue.

AUSTRALIA RESOURCES SECTOR BUOYANT

Australia's resources sector was jubilant the federal government, which took the stand at the climate talks producers wanted it to do, held out against emission curbs without carbon sink tradeoffs.

"I was encouraged to see that countries are prepared to stand their ground...ultimately that will lead to a much more practical outcome," said Michael Pinnock, joint executive director of the Australian Coal Association. Australia is a major coal producer.

The Australian aluminium industry, which uses major inputs of coal-fired electricity to produce almost 10 percent of the world's aluminium each year, was similarly pleased.

"We certainly supported the broad lines taken by the government...they did a pretty good job," said David Coutts, executive director of the Australian Aluminium Council.

Greenpeace activists chained themselves to a shale oil plant in Queensland to protest failure of the Hague talks and the World Wide Fund for Nature (WWF)

called on Australia to stop looking for carbon credit "loopholes".

For low-lying South Pacific island nations, no respite was in sight despite heart-rending pleas that, without action, they were destinated to disappear beneath the waves.

The World Bank says that South Pacific island nations have suffered more than US$1.0 billion in damages in the past 10 years from rising sea levels and tropical storms.

FLOODS FLAY SOUTHEAST ASIA

Meanwhile, Thailand, Malaysia, Indonesia and Australia have been grappling in recent days with floods that have claimed dozens of lives and forced thousands to flee their homes.

In Indonesia, massive landslides and flooding triggered by days of rain have killed at least 86 people on Sumatra island with the worst hit areas in the western and northern parts. Many towns and villages have been cut off and some destroyed.

"I am 60 years old, and as long as I have lived, I have never experienced anything like this," said one man caught in the flooding in Aceh on the northwestern tip of Sumatra.

In Thailand, torrential rains and flash floods have killed at least 12 people and disrupted the lives of at least 500,000 across southwestern provinces. In Australia, the worst floods in 50 years put a third of New South Wales and part of Queensland under water last week.

That followed flooding this year in Vietnam, Cambodia, Bangladesh and eastern India that killed hundreds of people and left millions homeless.

United Nations weather experts say rainfall and drought in Asia this year have been at the extremes of records over the last 100 years. That, they say, suggests a profound shift in the world climate, though they stop short for now of linking it directly to global warming.

China to Spend $24 Billion on Environment Over 5 Years

Reuters, 14 December 2000

BEIJING - China will invest 200 billion yuan ($24 billion) in environmental protection efforts in the next five years, the official Xinhua news agency said on Tuesday.

Two decades of breakneck economic development have ravaged China's environment. Five of the world's 10 most polluted cities are located there, and acid rain falls on a third of the nation.

Director of the State Environmental Protection Administration Xie Zhenhua was quoted as saying China would fund 1,200 key environmental projects during the period from 2001 to 2005. He said plans included reducing emissions, improving environmental quality and reining in ecological deterioration.

China has spent around 346 billion yuan on environmental protection during the last five years, accounting for 0.93 percent of gross domestic product, the agency said. ($1=8.277 Yuan).

Environment Tops Urban Worries

Environmental degradation and protection is the No. 1 concern for 3,000 urban Chinese in ten cities, sampled by the Horizon (Lingdian) market survey company. Following environmental issues came:
2. Unemployment;
3. Children's education;
4. Social stability and crime;
5. Corruption;
6. Economic growth; and
7. Social security for the aged.

Top concerns in previous years were social stability and crime in 1995, 1996, and 1997, and unemployment in 1998 and 1999. (Yangcheng Wanbao, Guangzhou)

Green Olympics 2008

On August 25, the Beijing Olympic Committee and municipal Environmental Protection Bureau announced a "Green Olympics Action Plan" as part of Beijing's bid for the 2008 games. The municipality made 30 specific pledges, which taken together would bring the quality of Beijing's environment up to developed-country standards by 2008.Beijing ranked second-worst out of 47 Chinese cities in a 1999 SEPA air pollution ranking—better than Taiyuan but still worse than Shenyang. Many Beijing residents hope that hosting the Olympics could force the Beijing government to expel Capital Steel, which is responsible for one-fifth of Beijing's air pollution, from the city's western suburbs. [Beijing Evening News]

Germany Flexes its Environmental Finance Muscles

U.S. Embassy, Beijing Environment, Science and Technology Update, 15 December 2000

The German government agreed to provide China US$450 million in low-interest loans to support environmental protection at the conclusion of a two-day Sino-German environmental summit in Beijing December 13, according to reports in the English-language China Daily. Projects to be financed under the new loan agreement will focus on energy conservation and development of clean energy resources, water conservation, air and water pollution control, ecosystem management, solid waste treatment, marine environment protection and urban tree planting.

The German delegation to the two-day conference was headed by Foreign Minister and Green Party member Joschka Fischer, and included the development and environment ministers, several members of parliament and representatives of 53 German firms -- in all over 400 people. They were received by Chinese Vice Premier Wen Jiabao and State Environmental Protection Administration (SEPA) Minister Xie Zhenhua.

The German Ambassador to China told China Daily that Germany has provided about US$2.4 billion in loans and technical assistance to China over the past 20 years, of which about one-third was targeted at environmental protection. German loans are typically tied to the purchase of German goods and services.

Beijing Plans Massive $17.8 Billion Facelift for 2008 Olympic Bid

18 September 2000

Beijing, the current favourite to stage the 2008 Olympic Games, has earmarked $17.8 billion to tackle traffic congestion and pollution ahead of next year's decision.

Keen to improve its air pollution and tangled traffic, the Chinese capital will start 50 environmental and transportation projects before the end of the year, China Daily reported.

As part of the facelift of the ancient city of 12 million people, nine central thoroughfares will be widened, two subway lines with 82 km of new track will be built and dark coal-fired boilers will be replaced with heaters which burn natural gas.

The capital, smothered with concrete by property developers since the late 1980s, will build green belts along major waterways and around the city, the China Daly said.

Beijing has already vowed to boost its number of smog-free days by replacing diesel buses with vehicles that run on clean-burning fuel and by implementing strict emissions tests.

The city government has promised an ambitious build-up of its roads and a crackdown on errant motorists and illegal parking to tackle traffic snarls and lawless driving.

An International Olympic Committee (IOC) delegation is slated to visit Beijing between February and April next year and the winning bid for the 2008 Games from final candidates Beijing, Paris, Toronto, Osaka and Istanbul will be announced in July.

At the Sydney Games, representatives from several of the competing cities have spoken of Beijing as the frontrunner. China's bid has many things going for it, with many of its sports facilities, airports, hotels and restaurants already up to international standards.

The Asian sports power, which finished fourth in the medals table in the last two Olympics, has also been applauded for axing 27 athletes from its team ahead of the Sydney Games, a number of them for failing a sort of blood tests.

Asia has only hosted the Games twice, in Tokyo in 1964 and Seoul in 1988, giving Beijing a theoretical advantage over main competitors such as Paris and Toronto.

Beijing sought to host the 2000 Olympics but lost out to Sydney by just two votes.

Shanxi Passes Energy Conservation Law

China Energy Efficiency Information Bulletin, August 2000
Provided by Liu Jingru, Beijing Energy Efficiency Center
Shanxi approved its provincial energy conservation law in late May, effective 1 July 2000. The law is generally consistent with the national energy conservation law passed in late 1997. Investments in engineering projects must consider energy efficiency and conservation before being approved. Technology standards are encouraged. The Shanxi provincial government shall provide concessional financing for deployment of efficient technologies.

Development of the Tenth Five-Year Plan

Environmental Health and Safety Review, November 2000

The draft of the Tenth Five-Year Plan (FYP) will be reviewed and approved by the National People's Congress (NPC) in March 2001.

The Yangtze River, the Yellow River and the Bohai Sea will be a new major environmental focuses of the Tenth FYP, together with other original "33211" program of the Ninth FYP. The number of key cities targeted for environmental protection will be increased from 47 to 100 in the Tenth FYP. Major tasks during the Tenth FYP include industrial pollution control, and four aspects of environmental protection for urban, ecological, rural and ocean areas.

For the Tenth FYP, China will further strengthen infrastructure construction in the water conservation, transportation and energy sectors. The lack of water resources has severely inhibited China's economic and social development. China has highlighted economising and protecting water resources and has stressed the importance of building water conservation projects. Various water-saving measures will be applied and the development of water-saving agriculture, manufacturing and service industries should be encouraged.

Another problem in the resource sector lies in energy, especially oil. Domestic oil production cannot meet the demands of economic and social development and spending large amounts of money on oil imports is not a long-term option. China will readjust the energy structure and take various measures to minimise oil consumption. A quota system is in planning which will promote the use of energy from renewable sources in the tenth FYP. Each region is to produce no less than 5.5 per cent of electricity from renewable energy sources.

China is aiming for a major breakthrough in infrastructure construction and environmental development in its western region in 5-10 years to create a good foundation for western development. Infrastructure construction, environmental protection, science and education will be major focuses in the development of the west. A number of key projects like the piping of natural gas and electricity from the west to eastern areas will also be given much attention.

Environmental Objectives and Investment Requirements for China's 10th Five-Year Plan

U.S. Embassy Beijing, Excerpted from November 2000 Report (For the full report, see http://www.usembassy-china.org.cn/english/sandt/)

Chinese officials estimate meeting the environmental objectives of the 10th Five-Year Plan will require investments totaling US$ 85 billion — 1.3 percent of projected GDP over the period. Only about 11 percent of that amount will likely come from the central government. More than half is expected to be financed by enterprises. China will seek US$ 4 billion from foreign governments and international financial institutions. Major investment priorities will be urban sewage treatment plants, control of industrial liquid waste, smokestack desulphurization equipment and other air-pollution controls. Environmental investments during the 9th Five-Year Plan period (1996-2000) fell well short of the mandated goals. But the ratio of environmental spending to GDP has been increasing and now exceeds 1 percent according to official sources.

At a workshop on environmental financing sponsored by the OECD and the China State Environmental Protection Administration (SEPA) in Beijing November 21-23, Chinese officials provided additional details on likely environmental objectives and spending targets for the 10th Five-Year Plan (2001-2005). The plan will be finalized early next year. A report prepared for the workshop by the SEPA-affiliated China Research Academy of Environmental Sciences (CRAES) estimated total investment requirements would be RMB 700 billion (US$ 85 billion) — or 1.3 percent of China's projected cumulative GDP over the five-year period, assuming annual growth of 7.5 percent.

Specific Environmental Targets

The CRAES report listed the key environmental objectives of the plan, as proposed by a panel of experts. The report's authors said the specific targets were still undergoing revision but would not likely deviate much from the following:

* The concentration of sulphur dioxide (SO2) in areas targeted for acid rain control will meet the national Grade II standard (daily average less than 150 micrograms per cubic meter, annual average less than 60 micrograms per cubic meter).

* Total nationwide SO2 emissions will be capped at 19 million tons (1999 emissions were 18.6 million tons, according to SEPA, down from 23.7 million

tons in 1995); emissions within the acid rain control zones are to be capped at 10.3 million tons (1999 emissions were 11.1 million tons).

* Ninety percent of urban households will use gas for heating and cooking (currently 84 percent do).

* The number of "key" cities targeted for pollution control will be raised to 100 (currently 47); all 100 cities are to meet applicable national standards by 2005 for air and water quality and noise (the current 47 were to have met the air and water quality standards this year, but most will not).

* All 100 key cities are to install automatic air quality monitoring equipment (several already have it); data will be transmitted by satellite to a national monitoring center.

Funding Requirements

The CRAES report identifies the following investment requirements to meet the goals of the 10th Five-Year Plan:

* RMB 300 billion (US$ 36 billion) for air pollution control, of which RMB 100 billion for desulphurization.

* RMB 10 billion (US$ 1.2 billion) for monitoring, enforcement and information gathering.

Major Projects

The CRAES report identified the following specific projects for which funding will be sought under the 10th Five-Year Plan:

* RMB 16.4 billion (US$ 2 billion) to install desulphurization equipment on 51 coal-fired power plants in the acid rain control areas.

Sources of Funding

The CRAES report estimates the central government will provide RMB 80 billion (US$ 9.7 billion) toward the above investments -- 11.4 percent of the total. Provincial and local governments are expected to provide another 34 percent. The remaining 55 percent is expected to come from business enterprises -- apparently through unfunded mandates. The report says China will seek US$ 4 billion from foreign governments and international financial institutions.

The CRAES report, and other documents tabled at the OECD workshop, recognize the need to improve China's investment environment and pricing policies to attract the necessary capital for needed environmental improvements. Stock markets, bond placements and revolving environmental funds are all being considered as possible financing options. None of these financing channels is currently well developed in China, however. SEPA hopes to raise substantial funds through pollution charges under the amended air pollution control law, which could be used to support a revolving fund.

Five-Year Plans Ain't What They Used to Be

As China has evolved away from a centrally planned economy, its five-year plans should be interpreted nowadays as general statements of intent and overall policy direction. Inclusion of a goal or project within the plan does not guarantee that it will be funded. The Ninth Five-Year Plan called for an identical commitment to environmental investments -- 1.3 percent of GDP. Through the end of 1999, actual outlays had fallen 44 percent short of that target. However, environmental spending has increased significantly in the last few years and now equals 1 percent of GDP, according to SEPA. SEPA Vice Minister Wang Xinfang, at the opening of the OECD workshop, said China needed to spend about 1.5 percent of GDP if it wanted its environment to improve. Other sources put the figure even higher -- the World Bank estimates China needs to spend 2 percent of GDP a year through 2020 just to improve air quality to the level that prevailed in the United States 20 years ago.

Comment

The content and participation at the environmental financing workshop is an encouraging sign that Chinese policymakers recognize the need to internalize environmental costs and rely on private and domestic capital markets to fund environmental investments. The workshop attracted participants not just from SEPA and its affiliated think tanks but also from the Ministry of Finance, the State Development Planning Commission, the State Administration of Taxation, the State Economic and Trade Commission, the Ministry of Foreign Trade and Economic Cooperation and the People's Bank of China. These are some of the key agencies that would have to formulate and implement detailed rules for any new financing mechanisms. However, they may have competing priorities, and the key will be whether already cash-strapped state-owned industrial enterprises can be compelled to undertake expensive environmental improvements under any financial regime.

Letter to the Editor: Naturally, You'll Need Better Information to be Well-Informed

31 July 2000

Editor's note: This letter was submitted to us by Jonathan Sinton and Jeffrey Logan in response to Mark Hertsgaard,s essay entitled: "Aerial view: Pollution is the problem, poverty the progenitor <http://www.chinaonline.com/commentary_analysis/economics/currentnews/secure/c00071841.asp>," which detailed China's broadest environmental problems.

Your 20 July article by Mark Hertsgaard vividly outlines some of China's enormous pollution problems, but unfortunately is infused with outdated information:

1) China is not projected to surpass the United States in greenhouse gas emissions by 2010, as stated by Mr. Hertsgaard. While the World Bank did publish a study in 1994 indicating this possibility, more recent studies suggest the World Bank forecast of carbon emissions in China were far overstated.

According to newer reports, such as the U.S.-China Country Study (1999), China's emissions may not surpass those in the United States until 2030 or later. Furthermore, trends over the past few years indicate that China is using even less energy and producing fewer greenhouse gas emissions than predicted by the Chinese and American experts who led that study.

2) Electricity blackouts are no longer chronic in most regions of China. In fact, many regions currently have a surplus of power capacity and more reliable power grids.

3) Mr. Hertsgaard's statement on future coal consumption is also out of date. More recent projections indicate that coal use will, at most, double by 2020. According to data from China's State Statistical Bureau and a recent study from Sinton and Fridley, coal consumption has declined by almost 10 percent since 1996.

More importantly, the article suggests that China is not taking any action to improve the environment. On the contrary, China has taken aggressive steps to conserve energy, reduce traditional pollutants and expand the use of clean energy.

These measures have already had a major impact on greenhouse gas emissions. Since the early 1980s, China has promoted a successful program to increase industrial energy efficiency. It is in the process of establishing the institutions and regulations that will make renewable energy a significant part of the energy sector in the near future. And it is pouring billions of dollars into an effort to boost natural gas use as a substitute for coal.

Clearly, China's environmental problems remain daunting, but the country is addressing these issues with much more zeal than Mr. Hertsgaard's article seems to suggest. Furthermore, the dichotomy Mr. Hertsgaard sets out between protection of the environment and growth of the economy fails to recognize that there are emerging international cooperative mechanisms, such as those under the Kyoto Protocol on climate change, through which China could benefit from external resources to undertake further environmental measures.

Given the misunderstandings that often damage relations between China and the United States, we believe it important to note the article's shortcomings.

Jonathan Sinton, Lawrence Berkeley National Laboratory, and Jeffrey Logan, Pacific Northwest National Laboratory.

Energy and Emissions for the 21st Century Environment

New opportunities and challenges await players in China's energy markets, as international efforts try to mitigate greenhouse gas emissions.

By Jeffrey Logan
Pacific Northwest National Laboratory

(22 November 2000) China's economy began a period of profound change in 1996. Painful domestic reforms combined with the impacts of the Asian financial crisis caused a sudden slowdown in demand for Chinese commodities and manufactured products. Many sectors of China's economy became oversupplied for the first time in history beginning in 1997. The impact on China's energy sector, although still poorly understood, has been profound.

Coal sector: Rock bottom?

Reported use of coal in China dropped by over one-fifth between 1996 and 1999, while gross domestic product grew by one-quarter. Reasons for the dramatic divergence are poorly understood due to limited information, but preliminary data for the first

nine months of 2000 suggest that demand is returning.

Use of other forms of energy has continued to grow and does not appear to have played a significant role in the decline of coal consumption. Understanding how such a rapid decoupling of coal use and economic growth occurred might shed additional light on future domestic trends and international efforts to mitigate greenhouse gas emissions.

Activity in China's coal markets has swung wildly in the past five years. Through the mid-1990s, Chinese energy planners questioned whether coal supply and transport capacity would be able to satisfy the appetite of the market's rapidly growing demand.

After the apparent free fall in coal production and consumption during 1998 and 1999, these concerns draw much less attention today. Dealing with underemployed rural workers—some of them miners who used to work in the small coal mines that have since closed—is a much greater issue now.

Reported coal production peaked in 1996 at 997 million tons of coal equivalent (MTCE).1 By the end of 1999, output had declined by one-quarter to 750 MTCE. The trend in reported coal consumption over this period is similar, although slightly less dramatic, falling from 1,038 MTCE to 819 MTCE.

Over these three years, coal use as a percentage of total primary energy consumption fell from 74.7 percent to 67.1 percent. Not even the most progressive of Chinese energy watchers could have predicted such a rapid decline. Preliminary data for 2000 indicates that coal production and use are beginning to stabilize.

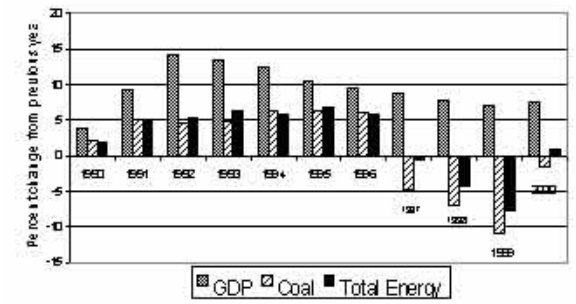
Determining why

Determining how and where coal use may have declined is critical if analysts hope to learn useful lessons from the phenomenon. Data cited by Sinton and Fridley suggest that improvements in coal quality could account for roughly 75 MTCE of the decline, while improved efficiency resulting from closure of small, inefficient factories could explain another 75 MTCE to 125 MTCE.2

Together, these changes account for up to 85 percent of the decline from 1996, but for only about 50 percent of the reduction from what earlier forecasts had predicted for 2000. Additional data are needed to gauge the impact from other variables within the economy such as state-owned enterprise reform, structural change, variation in coal stockpiles and measurement of GDP.

It seems likely that at least a portion of the apparent decline is due to unreported coal production and consumption. The central government claims to have closed more than 33,000 small coal mines since 1998, primarily to help improve the bottom line of larger, state-owned coal companies.

These small mines are typically owned by private firms or local governments and are regulated poorly. Keeping these mines closed is difficult because local governments often have economic interests at stake.



Source: Zhongguo Tongji Zhaiyao 2000 [China Statistical Abstracts], State Statistical Bureau. China Statistical Yearbook 1999, State Statistical Bureau; Figures for 2000 based on preliminary data in "China Statistical Information Network," State Statistical Bureau.

Unreported coal production and distribution could account for the remaining portion of the decline in apparent consumption mentioned above, but additional field research is needed to verify the numbers.

The future of China's coal sector is influenced by competing trends. Growth in coal demand appears to be returning this year, although the government is still concerned about excess production. Concern over environmental quality has continued to put pressure on planners to find cleaner sources of energy than coal.

Natural gas and, to a lesser extent, renewable energy, will likely offset a share of coal use over the coming decades. But other forces will continue to encourage the use of coal, predominantly from the political need to keep rural workers employed.

Additional market reforms are also likely to improve economies of scale within China's coal sector, which could result in lower coal costs that in turn inhibit development of alternative energy supplies.

Oil: Record imports, surging investment

China depends on imported oil now more than at any time in its modern history. Average oil production grew by a scant 1.9 percent annually between 1995 and 2000, while demand rose by more than 5.3 percent each year. Imports of crude oil are expected

to surpass 60 million tons in 2000 compared to domestic production of about 165 million tons.

Domestic production remains relatively flat although large verified reserves indicate a significant potential to boost output. Most of the currently producing fields are worn out, relying on outdated technology and distorted incentives.

As a result, oil extraction is expensive and challenging. Petroleum prices remain largely state-controlled, although recent reforms have kept retail prices pegged to international levels.

To improve energy security, China began in the early 1990s to acquire interests in oil fields abroad. Significant investments occurred in the Middle East, central Asia, Africa and South America. Some of these ventures have proven costly, slow to develop and less than ideal.

Others, notably in the Sudan, have attracted negative political attention. These overseas projects will continue to play a role in meeting China's future oil needs, but expectations have declined somewhat. Attention has shifted back to reform of China's state-owned oil firms and closer cooperation with international oil companies and markets.

Domestic restructuring, international interest

China reformed the petroleum industry in 1998 to separate regulatory and administrative functions from ownership and operation. The potential impact of major structural reforms on the country's two major state-owned petroleum companies—China National Petroleum Corp. (CNPC) and China Petrochemical Corp. (SINOPEC)—is hotly debated.

Both companies have taken steps to improve efficiency but continue to operate in distorted, opaque markets and remain overstaffed. Despite these drawbacks, multinational oil companies and international investors have demonstrated an interest in controlling a piece of China's future petroleum market by investing heavily in these enterprises.

China's two major petroleum companies raised more than US$6 billion in initial public offerings in the New York and Hong Kong stock exchanges earlier in 2000. PetroChina, a subsidiary of CNPC, attracted worldwide attention in April by raising US$3 billion from international investors. At least one multinational oil company agreed in advance to purchase a large portion of the shares in exchange for exclusive business opportunities within China.

SINOPEC, in its own IPO in October, raised about US$3.4 billion, again with strong commitments from international oil companies to buy shares. China's other petroleum company, China National Offshore Oil Corp. (CNOOC), canceled plans for an IPO in 2000, but hopes to try again in February 2001.

Multinational oil companies also continue to invest directly in project-specific opportunities, mainly in the downstream and retail sectors. International investors will push for changes in the way Chinese petroleum companies operate in exchange for their capital, although the degree and schedule of these changes are largely uncertain.3

Electric power: Rapid growth returns despite halting reforms

China's power sector continues to grow rapidly despite significant distortions. Installed capacity surpassed 300 gigawatts in early 2000, although per capita power consumption in China is only one-thirteenth that in the United States.

A power glut appeared in many parts of the country beginning in 1997 and 1998, prompting officials to declare a moratorium on construction of new, traditional power plants for three years. The power glut resulted in some local grid operators breaking their power purchasing agreements with power plants and raised concern over enforcement of contract law.

Growth in power demand fell to less than 3 percent in 1998, but recovered to a more typical value for China of 6 percent in 1999 and a surging 10 percent during the first nine months of 2000.

While some regions are still oversupplied, others like Guangdong are having trouble meeting this year's demand growth of approximately 20 percent. The supply-and-demand mismatches have altered the planned transmission route for power that will be generated at the Three Gorges Dam beginning in 2003. The new plan will send more power to hungry Guangdong and less to the saturated north and east.

Over the next few years China will begin to experiment with competition in some regions. Power generators will compete to sell power to the grid in an effort to improve overall efficiency and lower costs.

True competition requires—at a minimum—a robust transmission grid, noncolluding suppliers, independent management of the power pool, and enforceable laws. It will take some time before larger regions in China are ready to introduce competition in electricity generation.

The State Power Corp., which owns the vast majority of power plants in China, continues to influence the pace of reform within the sector despite restructuring in 1998 that attempted to remedy this situation.

Growing importance of natural gas

Natural gas is enjoying a renaissance throughout the world due to its relatively clean combustion and high efficiency. Recent improvements in gas turbines, fuel cells and energy transformation technologies that use natural gas even more efficiently promise to keep future demand strong.

Throughout China's modern history, natural gas has been largely ignored as a meaningful source of energy, but that now appears set to change. Planners hope that gas will account for at least 10 percent of all commercial energy by 2020, up from the current 3 percent.

It could account for an even larger slice of the energy pie given the right encouragement. Significant market reform and investment is needed, however, to identify domestic gas resources, build transport and distribution infrastructure, and—perhaps most importantly—create markets for gas utilization.

Fuel switching from coal to gas benefits both regional and global environmental quality. For every 30 billion cubic meters (BCM) of gas used in place of coal, sulfur and carbon dioxide emissions would decline by approximately 1 million and 20 million tons, respectively.4

Environmental benefits are largely pushing the renewed interest in natural gas. Switching from coal to natural gas slashes emissions of harmful pollutants, including carbon dioxide, and improves operating efficiency.

City planners in Beijing hope to continue converting thousands of industrial boilers operating in the downtown area from coal to natural gas in an effort to improve air quality enough so that the city can host the 2008 Olympics.

From where it is to where it is needed

China has more methane-rich gas than once thought. Major gas discoveries have occurred over the past few years in western China and in offshore regions. These larger fields can now justify the construction of long-distance pipelines.

China will begin building a cross-country pipeline from Xinjiang to Shanghai in 2001 capable of transporting 30 BCM of natural gas per year.5 Other pipelines have recently been completed that transmit gas to Beijing and Shanghai.

Coal-bed methane is also receiving greater attention and several international oil companies have signed contracts in China to explore for and develop coal-bed methane fields. Coal-bed methane is expected to contribute 10 BCM to overall supply by 2010.

Foreign investment is flowing to some of these projects, although perceived barriers that increase risk prevent much greater utilization of overseas capital.

China also seems more willing to consider importing large quantities of natural gas. At least one memorandum of understanding has been signed with Russia to build a natural gas pipeline from Siberia to northern China. Thorny regional issues need to be addressed, however, to develop financing for the pipeline.

China also recently announced that its first liquefied natural gas import terminal would be built in Guangdong, and could announce the winning bidder by the end of 2000. Other terminals could quickly follow along the coastline from Shenzhen to Shanghai.

Energy users will need greater incentives to switch to natural gas, however, if sustainable markets are to develop nationwide. Currently, prices and regulations do not reflect the environmental benefits of using natural gas in place of coal.

Forecasts slashed for CO2 emissions

Approximately 85 percent of China's greenhouse gas emissions are associated with fossil fuel production and use. Carbon dioxide produced from the combustion of coal is the single largest contributor to China's total greenhouse gas emissions.

The apparent decline in coal consumption therefore has a significant impact on China's greenhouse gas emissions. If the reduction in coal use described earlier is real, China's emissions are not only far below the level earlier forecasts had predicted, but also down significantly from the peak level in 1996.

International and Chinese experts collaborated on at least five major studies during the 1990s on greenhouse gas emission scenarios. One main goal in each study was to project baseline future energy use and associated carbon dioxide emissions and then provide at least one alternative policy scenario resulting in lower emissions.

The policy scenarios, for example, identified variables such as standards for domestic appliance efficiency or fuel switching that could be changed through regulation or market incentives to mitigate carbon emissions.

Each study translated the energy consumption forecasts into carbon dioxide emissions using carbon

equivalent coefficients. There was some variation in the coefficients used, but in general they follow guidelines defined by the Intergovernmental Panel on Climate Change.6

Carbon dioxide emissions in 2000, calculated from reported energy consumption statistics, are significantly lower than the average value forecasted from these studies. The average forecast of carbon dioxide emissions from fossil fuel use in the baseline scenarios from the five studies was 950 million tons of carbon.

Based on energy statistics reported through 1999 and preliminary statistics published for the first nine months of 2000, carbon dioxide emissions in 2000 will be approximately 725 million tons of carbon, 225 million tons less than the forecast average. Revised energy consumption estimates that assume some unreported coal consumption indicate the decline is a more modest 180 million tons of carbon.

China has demonstrated increasing interest in playing a constructive role in international carbon mitigation efforts. It still believes that industrialized countries must act first to address the problem they largely created, but now appears ready to cooperate in the Clean Development Mechanism and other joint carbon mitigation activities that have additional domestic benefits.

Conclusions

Chinese energy markets rode a roller coaster of uncertainty over the past five years. Coal use fell precipitously, even as the economy continued to expand, but market demand is beginning to recover and future demand will likely grow, albeit slowly.

Domestic oil production is stagnant, but robust demand has forced China to import growing quantities of oil. Surging international investment is also helping to accelerate the pace of reform within China's petroleum sector.

Electric power supply overshot demand from 1997 to 1999, causing a sudden slowdown in foreign investment in the power sector. Strong growth over the past year has begun to correct the mismatch, however, and China's overall power consumption remains relatively low.

After decades of being ignored, China's natural gas sector looks set to play a much larger role in helping China meet its energy needs efficiently with minimal environmental damage.

Government policies focused on energy conservation and energy efficiency within the central planning context succeeded in preventing the need for a substantial amount of new energy supply over the past two decades.

Opportunities to improve the overall efficiency of energy use in China remain enormous and the transition to a market economy is creating new opportunities for companies to profitably cut energy use.

Domestic reforms continue to tighten the links between the Chinese economy and the global marketplace. This integration will help overcome the distortions in energy markets created during decades of central planning. It will also have an overall positive impact on the environment.

The pace of implementing these reforms, however, is likely to continue in fits and starts as China struggles to define the needs and priorities of its huge population in a world that is changing almost as rapidly.

Notes:

1. One million tons of coal equivalent equals 29.3 x 1015 joules.

2. Sinton, J. and D. Fridley. 2000. What Goes Up: Recent Trends in China's Energy Sector. Energy Policy, 28(10): 671-687. For a more complete discussion of ideas presented in this commentary, particularly energy savings from closure of industrial facilities, see Logan, J. "Energy and Carbon Trends in China: Assessing Statistical Uncertainty at the Turn of the Century." Forthcoming.

3. PetroChina, for example, agreed to shed 10,000 workers each year through 2002 to entice investors to buy shares in its IPO. Transparency in the relationship between PetroChina and CNPC is poor, however, and investors remain in the dark about potential cross-subsidies.

4. Thirty billion cubic meters of natural gas is equivalent to approximately 1.2 x 1018 joules, or about 55 million tons of Chinese coal.

5. Assuming that half the gas is used to replace coal in power generation and the other half is used evenly in industry and residential applications.

6. IPCC guidelines are 25.8 kilograms of carbon per gigajoule of coal energy, 20 kilograms of carbon per gigajoule of oil energy, and 15.3 kilograms of carbon per gigajoule of natural gas energy.