Status Report on Energy Efficiency Policy and Programs in China: Recent and Related Developments

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Recent Activity in Energy-Efficiency Policy and Implementation

Energy Conservation Law

In general, there has continued to be slow progress in developing implementing regulations for the Energy Conservation Law since our last report (December 1999). SDPC continues to seek localized implementing regulations from the provinces (and province-level cities), as only Shandong, Zhejiang, Shanghai and Beijing are the only provincial administrations that have so far prepared them. Shanghai, often in the vanguard of energy efficiency activities in China, reportedly has established a uniformed energy-conservation inspectorate, which has powers to inspect facilities, to levy fines on offenders, and even to close down offenders.

SETC is currently trying to define and implement programs in line with the provisions of the Energy Conservation Law. Areas of particular interest to SETC include:

- administrative methods for energy intensity targets/quotas for energy-intensive industrial products (these concern the energy intensity of industrial processes);
- methods for enterprise energy audits;
- development of an information management system (information database on industrial energy efficiency policies and activities), for use by key energy users in China;
- administrative methods for end-use electricity conservation and implementation of demand-side management; and
- energy-efficiency labeling for industrial energy-using equipment;

There has been much interest in China in market aggregation for energy-efficient products through government procurement programs. Some pilot experience has been gained; the Beijing Energy Management Center, established through the World Bank/GEF Energy Efficiency Program, in connection with the UNDP-funded China Green Lights program, assisted the Beijing subway system in carrying out a purchasing program to install CFL in all Beijing subway stations. China has also reportedly begun to implement government procurement programs for energy-efficient products, in accordance with a recently issued provisional regulation (Wang, 2000b). This topic will be investigated further.

Standards and Labeling

A number of new efforts in the area of energy efficiency standards and labeling have been formally approved and initiated since the beginning of the year. When these activities are fully underway, China will be receiving technical assistance in the key 'tripod' areas of mandatory energy efficiency standards, mandatory (unified) energy informational labeling, and voluntary energy-efficiency labeling.

CLASP. The Collaborative Labeling and Appliance Standards Program was formally approved by the UN Foundation this spring, establishing a $1.5 million collaboration among Lawrence Berkeley National Laboratory, the Alliance to Save Energy, the International Institute for Energy Conservation, and UNDESA (Department of Economic and Social Affairs) to promote the development of appliance efficiency standards and energy labeling worldwide. China is a major country of focus for CLASP, and a programming mission to China will take place June 19-24 to establish the country priorities for support in this area. Likely areas of support include cofunding of the Energy Foundation effort in appliance standards (below) and cofunding of the USEPA technical assistance in energy efficiency labeling of appliance (below).More information on CLASP can be found at their website http://www.clasponline.org, due to be operational during the summer of 2000.

Appliance Efficiency Standards. A further round of training support for the China National Institute of Standards (CNIS) in the development of minimum efficiency standards for fluorescent lamps began in May 2000. This project, part of a 3-year project supported by the Energy Foundation's China Sustainable Energy Project (CSEP), will train CNIS staff in the analytical methodology and modeling used in the development of US efficiency standards.

The Energy Foundation's CSEP program has also begun a project to develop a unified energy informational label for China, in partnership with SETC, CNIS, and the State Bureau of Technical Supervision (SBTS). International experts include Paul Waide, Inc. of the UK, and IIEC staff from Bangkok. Initial work this year will focus on the development of a regulatory framework for the issuance and management of a unified energy label.

Energy Efficiency Labeling. In August 1999, China formally launched the China Energy Conservation Label and established the Center for Energy Conservation Product Certification (CECP) to implement and manage the program. The first label awarded was for refrigerators, and over half of the models certified for the label were produced by Haier, a major participant in the development stages of the US-China CFC-Free Energy Efficient Refrigerator project. In order to strengthen CECP's ability to collect and analyze data for the establishment of energy efficiency criteria for other products, USEPA has approved a 1-year program to train CECP staff in the analytical methodology and modeling used in the US Energy Star program.

Standards for Industrial Equipment. Staff at SETC continue to voice support for the creation of energy-efficiency standards for industrial equipment—standards that are quite separate from the household appliance efficiency standards now being created. While the exact goals and nature of the desired program remains unclear, there seems to be strong support for activity in that area.

Retiring of Obsolete Equipment

SETC has already been actively engaged in the listing of technologies and specific enterprises and/or pieces of equipment slated for retirement. In 1998, SETC came out with a list of several hundred small cement plants, glass plants, and other industrial facilities, as well as small power plants. It appeared for a while that little progress was being made in this activity, but the plants were given until the end of 2000 to shut down the specified equipment. Implementation is in the hands of local (municipal and county) Economic and Trade Commission, which are reported to be carrying out the provisions strictly, with support from local Environmental Protection Offices. The targets of the list are expected to be shut down as scheduled.

Environmental Protection Policy

More forceful implementation of environmental regulations is leading to plant closures, which will likely have the effect of improving average energy efficiency. This year, for instance, up to 15 of China's small aluminum smelters, with combined capacity of 85 kt per year (about 3% of total production capacity), will be permanently closed for failure to comply with environmental standards.

Energy efficiency was directly addressed in the latest revision of the *Air Pollution Control Law*, passed by the National People's Congress on 29 April 2000, and effective from 1 September 2000. Article 19 states that enterprises should use energy-efficient, low-polluting clean production technologies, and tasks the overall economic management authorities (SDPC and SETC) with promulgating lists of equipment to be retired permanently from service. Other articles have significant implications for energy efficiency. In particular, Chapter 7 (Articles 24 to 31) deals exclusively with pollution from coal burning. Article 24 requires sorting and washing of high-sulfur and high-ash coal, which would lead to marketing of coal that could be used more efficiently in end-use equipment. Provisions to improve the structure of household fuels and to provide heat through district heating schemes would also tend to raise the average level of energy efficiency. The provision requiring desulfurization equipment on some new and repowered power plants (Article 30), on the other hand, could raise the net heat rate for delivered electricity, as a significant fraction of electricity would be diverted to a new in-plant use.

The longest chapter of the *Air Pollution Control Law* (Chapter 6, Articles 46 to 65) deals with legal responsibility, including punishments for specific offences and the government agencies with authority for carrying out such punishments. For instance, Article 46 states that fines of up to 50,000 yuan may be levied on polluters who: (1) refuse to report or misreport emissions of criteria pollutants; (2) refuse to allow inspections or interfere with inspections by environmental protection authorities; (3) incorrectly operate air pollution control equipment, or remove or incapacitate air pollution control equipment without permission from environmental authorities; or (4) fail to implement measures to prevent fires and dust emissions from

coal fuels. Nearly all the specified punishments are fines and plant closures, but there are more serious penalties, such as revocation of production and foreign trade licenses (for failure to adhere to the State Council's schedule for phasing out of production, import and use of ozone-depleting substances, Article 59). In the case of air pollution accidents that lead to serious public financial damages and/or harm or kill people, criminal penalties can be imposed "according to the law" on those directly responsible for causing the accident (Article 61).

Focus for Energy-Efficiency Policy in 2000

According to SDPC, the focus for energy conservation work in 200 will continue to be in the area of end-use efficiency, with priority given to completing the legal and regulatory system for energy efficiency, and developing in a timely fashion a system of inspections for implementation of energy conservation work. Other priorities include the following:

- promoting energy-efficiency demonstration projects in the major energy-consuming sectors;
- strengthening energy inspections of new investment projects;
- setting of preliminary minimum energy-efficiency standards and energy-efficiency classification standards for energy-intensive products that are produced in large quantities;
- developing of energy-efficiency labels and a certification system for energy-efficient products; and
- strengthening of energy conservation management at key energy-consuming enterprises.

In a related area, the emphasis in power sector development will continue to be on improving and extending urban and rural distribution grids, as well as interconnection of regional and provincial grids. This can be expected to lead to reductions in the high line-loss rates that prevail in China (8.13% in 1998, not counting losses in many of China's small local distribution networks, e.g., at large plant complexes that serve many industrial, service, and residential users). In many areas of China, power generation capacity continues to exceed demand (although consumption of electricity is growing at a rate in excess of 6%). While this situation prevails, the government's focus for power generation development will be on power supplies with long lead times, but which are considered more environmentally sustainable than current plants, i.e., large hydropower plants and demonstration plants that employ clean-coal technologies.

Energy Efficiency in the Tenth Five-Year Plan

SDPC is currently drafting the Tenth Five-Year Plan, which will guide government activity from 2001 to 2005. A draft will be prepared by September 2000, and the final plan will be released in March 2001. SDPC's Basic Industry Department (Infrastructure Department) will prepare the portion of the plan dealing with energy efficiency and renewable energy.

The Beijing Energy Efficiency Center (BECon) of the Energy Research Institute (ERI) has been tasked to assist SDPC prepare the energy-efficiency chapter of the Tenth Five-Year Plan. Specific recommendations for policy targets are currently being deliberated, and will likely fall into the following three areas:

1. **Improve the structure of energy supply.**
   - plan for development of natural gas and other high-quality energy resources
   - plan for development of renewable energy resources, e.g., wind power
2. **Raise and strictly control energy-efficiency standards for new productive capacity and residential energy-using devices.**
- energy-efficiency audits of new investment projects
- minimum energy-efficiency standards for new equipment
3. **Improve existing productive capacity.**
- retire obsolete productive capacity
- maximum energy consumption quotas for energy-intensive products
- implement national energy-conservation projects

The first of these areas would represent a departure from previous Five-Year Plans. In the past, energy-efficiency planning has not directly touched on China's fuel structure, although efficiency improvements in

energy supply (e.g., power generation, transmission, and distribution) have typically been included in plans and policies. Including targets for expanding natural gas supply and improving coal would represent a step towards integrating energy supply development strategy with energy-efficiency policy.

The second two areas represent continuity with past energy-efficiency policy, and would encompass both new directions in line with the general change in the role of government involvement in the economy (from a player to a referee), and attempts to strengthen existing policies and programs that are seen to have continuing value.

Developments in Energy and Other Industries in 1999

Important changes in the structure on energy producing and consuming industries are taking place that have significantly affected energy efficiency. Most of these developments are linked to broadly targeted policies that are driven primarily by economic concerns, and secondarily by goals for environmental protection and energy efficiency.

Among the most important activities have been campaigns, begun in 1998 and 1999 and continuing in 2000, to shut down small mines, refineries, and manufacturing facilities. Many thousands of facilities across the country were shut down in 1999, including:

- 31,000 small coal mines and several hundred medium to large mines;
- 70 small oil refineries;
- numerous small power plant;
- small cement plants with a combined production capacity of 40 Mt/yr (out of a national total in excess of 600 Mt/yr);
- small glass plants with a combined production capacity of 15 million cases[1]/yr (out of a national total of over 170 million cases/yr); and
- textile manufacturing capacity of over 9 million spindles.

The plants that were shut down were typically small, highly polluting, and financially marginal. While the impact cannot be easily quantified, it is likely that these closures have resulted in widespread improvements in sectoral efficiency, by raising the average energy-efficiency of production processes. At the same time that small plants have been closed, new production capacity, generally with better energy performance, has come on line. The closure of small mines has also improved the quality of fuels available on the market, probably leading to significant improvements in combustion efficiency in most applications. While the closure of small mines has been expected to improve financial performance in the coal sector, the persistence of a buyer's market and generally flat prices for coal resulted in further losses for the coal industry, amounting to over 4.5 billion yuan in 1999.

Continued expansion of high-technology industries and service industries has tended to reduce the economic energy intensity of the economy, although that effect is at least partly cancelled by the shrinking of output from the non-energy intensive agricultural sector.

These factors may help account for the protracted fall in energy consumption in China, particularly of coal, while power generation and output of most energy-intensive industrial products continues to rise.

Miscellaneous

Current Number of Energy Conservation Centers in China

In the 1980s, during the peak period of direct government financial and administrative support for energy efficiency, China had over 200 energy conservation technology service centers throughout the country. These were originally supported largely with government funds, but have since become dependent almost entirely on funds generated from sales of their services. Some of the energy conservation technology

[1] Flat glass output in China is measured in standard 50-kg cases.

service centers have closed, and currently there are about 180 centers, employing over 3,200 staff. They have functions similar to US Industrial Assessment Centers, and some may have the potential to form the core of ESCOs.

Data

Figure 1. Primary Energy Production by Fuel, 1980-1999

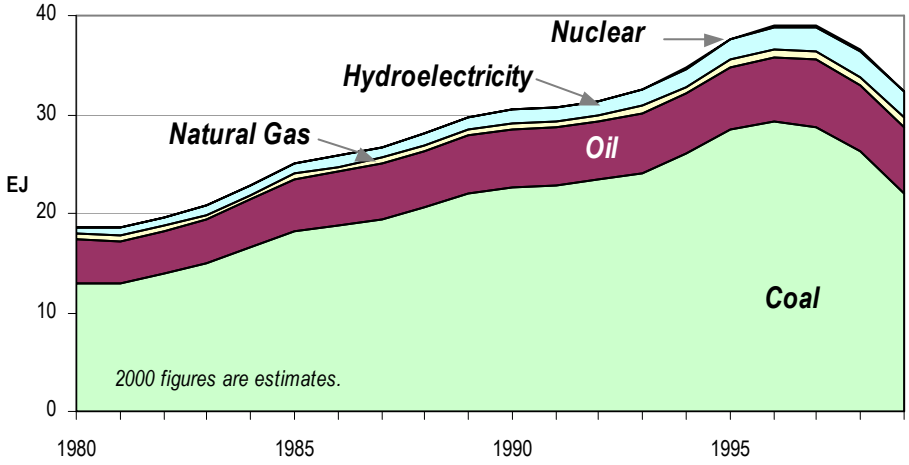

Table 1. Primary Energy Production by Fuel, 1980-1999, with projection for 2000, EJ

	Coal	Oil	Natural Gas	Hydro electricity	Nuclear Electricity (a)	Total
1980	13.0	4.4	0.6	0.7		18.7
1981	13.0	4.2	0.5	0.8		18.5
1982	14.0	4.3	0.5	0.9		19.6
1983	15.0	4.4	0.5	1.0		20.9
1984	16.5	4.8	0.5	1.0		22.8
1985	18.3	5.2	0.5	1.1		25.1
1986	18.7	5.5	0.5	1.1		25.8
1987	19.4	5.6	0.5	1.2		26.8
1988	20.5	5.7	0.6	1.3		28.1
1989	22.1	5.8	0.6	1.4		29.8
1990	22.6	5.8	0.6	1.5		30.5
1991	22.8	5.9	0.6	1.4		30.7
1992	23.4	6.0	0.6	1.5		31.4
1993	24.1	6.1	0.7	1.7	0.0	32.5
1994	26.0	6.1	0.7	1.9	0.2	34.8
1995	28.5	6.3	0.7	2.1	0.1	37.7
1996	29.2	6.6	0.8	2.3	0.2	38.9
1997	28.8	6.7	0.8	2.5	0.2	38.8
1998	26.2	6.7	0.9	2.6	0.2	36.4
1999	22.0	6.7	1.0	2.5	0.1	32.2
2000 (b)	22.4	7.1	1.0	2.6	0.2	33.2

(a) Nuclear electricity generation is typically rolled into the hydropower generation figure in Chinese statistics, and is included here for informational purposes.
(b) Figures for 2000 are estimates based on reports of Chinese national plans.
Source: State Statistical Bureau, various years, *China Statistical Yearbook* and *China Statistical Abstract*.

Figure 2. Primary Energy Consumption by Fuel, 1980-1999

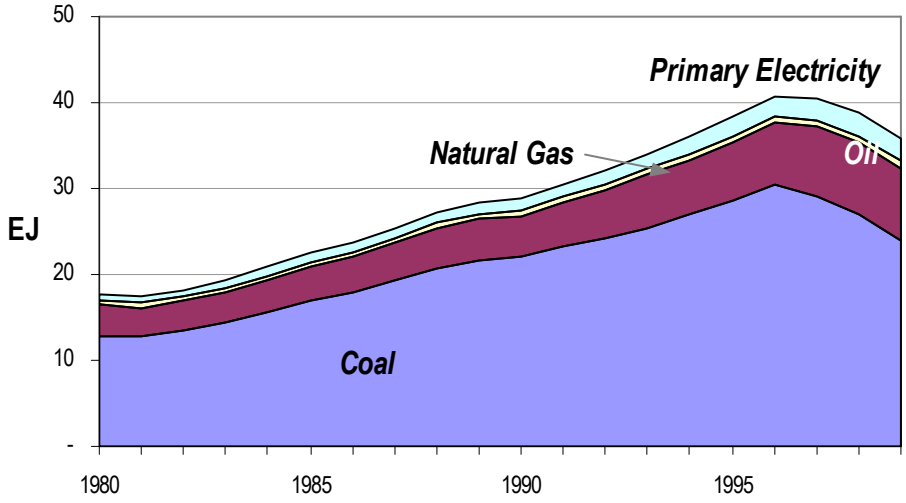

Table 2. Primary Energy Consumption by Fuel, 1980-1999, EJ

	Coal	Oil	Gas	Primary Electricity	Total
1980	12.8	3.7	0.5	0.7	17.7
1981	12.7	3.5	0.5	0.8	17.4
1982	13.4	3.4	0.5	0.9	18.2
1983	14.4	3.5	0.5	1.0	19.4
1984	15.7	3.6	0.5	1.0	20.8
1985	17.0	3.8	0.5	1.1	22.5
1986	18.0	4.1	0.5	1.1	23.7
1987	19.3	4.3	0.5	1.2	25.4
1988	20.8	4.6	0.6	1.3	27.3
1989	21.6	4.9	0.6	1.4	28.4
1990	22.0	4.8	0.6	1.5	28.9
1991	23.1	5.2	0.6	1.5	30.4
1992	24.2	5.6	0.6	1.6	32.0
1993	25.4	6.2	0.6	1.8	34.0
1994	27.0	6.3	0.7	2.1	36.0
1995	28.7	6.7	0.7	2.3	38.4
1996	30.4	7.3	0.7	2.2	40.7
1997	29.0	8.3	0.7	2.5	40.5
1998	27.0	8.3	0.9	2.6	38.8
1999	24.0	8.4	1.0	2.4	35.8

N.B. Coal use is greater than production due to significant drawdowns of stockpiles. Oil use is greater than production due to imports. Natural gas use and hydroelectricity use are slightly smaller than production due to distribution losses.
Source: State Statistical Bureau, various years, *China Statistical Yearbook* and *China Statistical Abstract*.

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