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Energy in China: Paradoxes, Policies, and Prospects

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INTRODUCTION

Twenty-one American oil firms have submitted bids to the China National Offshore Oil Corporation (CNOOC) for the right to explore for petroleum on China's southern continental shelf. The Atlantic Richfield Corporation, which signed a contract with CNOOC on September 19, 1982, will soon begin exploratory drilling south of Hainan Island. Occidental Petroleum has signed a contract to do a feasibility study for a major coal mine in North China. As part of the US-PRC Hydropower Protocol signed in 1979, the Army Corps of Engineers is advising the Chinese Ministry of Water Conservancy and Electric Power on a major project in Southwest China. China's search for new supplies of energy promises to tie the country to the United States--and to the world economy in general--in complex and unprecedented ways.

As natural as this may seem to Americans, China's leaders have been very reluctant to allow foreign corporations to play a major role in the development of China's energy resources. Their reluctance stems from a mixture of pride, fear, and inexperience. They were--and still are--proud of China's indigenous capabilities, fearful of becoming dependent on and victimized by foreign firms, and unfamiliar with the technical, financial, and legal requisites of large-scale joint ventures with capitalist firms. If they could, they would prefer to rely on outsiders only to a limited extent; for example, for advanced equipment that China cannot produce. Indeed, the policies first adopted by Mao's successors embodied precisely this approach. It made superficial good sense, but soon foundered on historical, logistical, technical, and political obstacles. By the late 1970s, shortages of fuel and power had become chronic, in spite of the fact that China produces more commercial energy than all but a handful of nations.

The current approach recognizes the difficulties involved in opening new mines and oil fields and in



A Chinese Drilling Rig in the South China Sea (Eastfoto)

sustaining production in older fields. China probably could develop its energy resources without foreign assistance, but neither the country nor the political leadership can afford further delay. Energy demand, and the Chinese populace's expectations for a higher standard of living are rising inexorably. Forced to choose between economic stagnation and popular dissatisfaction on the one hand and partial reliance on foreign firms on the other, the leadership has opted for a less restrictive definition of self-reliance. But the door to the capitalist world could be pushed shut by the forces that made self-reliance so attractive in the first place.

THE INITIAL POST-MAO ENERGY POLICY

The strategy of development adopted shortly after the death of Mao Zedong and purge of the "gang of four" in 1976 assumed that energy production could and would increase steadily. This was a critical assumption because large and rapidly growing amounts of fuel and power were needed to realize the "four modernizations" (agriculture, industry, national defense, and science and technology). This in turn would enhance the legitimacy of the Communist Party and the "socialist system" by restoring political and economic stability, improving economic performance, and generating tangible

and substantial social benefits.

Without expanded energy supplies, it would be impossible to achieve promised improvements in the performance of farms and factories. Mechanization was supposed to raise agricultural output while easing the lot of the peasantry. Freed from the "irrational" (i.e. political) constraints imposed by the discredited "gang of four," industry was to provide consumer goods for town and countryside alike. Chinese planners believed all this was possible because they assumed that energy would be cheap and abundant.

This ambitious modernization effort was to be financed as well as fueled by the country's energy resources. Exports, primarily of crude oil, were expected to earn vast amounts of foreign exchange. Revenue from oil sales would, in turn, be used to purchase advanced technologies, complete industrial plants, and other ingredients needed for China to leapfrog across intermediate stages of development to become a "powerful, modern, socialist state" by the end of the century. Again, obtaining adequate supplies of energy was treated as a nonproblem.

Why were China's leaders so sanguine about the country's ability to meet its new energy needs at a time when the concern about a current or impending "energy crisis" was a major issue in most capitals?

First of all, they knew that their country had vast deposits of fossil fuel. Although the precise magnitude of China's reserves are uncertain, because much of the country remains unexplored and the quality of available data is uneven, they clearly are substantial. Recoverable coal reserves are now estimated at more than 600 billion metric tons (bmt), roughly the same magnitude as those of the United States and the Soviet Union. Estimates of both total and recoverable oil reserves vary widely but, on the basis of current information, probably fall within the range of 3-10 bmt. In the mid-1970s, when the initial plan was being drafted, Chinese officials frequently used substantially higher figures when describing their country's potential. Little is known about the size of natural gas deposits, but they too are impressive--perhaps on a par with those of the United States. China also has the largest theoretical hydropower potential in the world (500 million kilowatts); less than 5 percent of this potential has been tapped.

But resources in the ground do not fuel economic development; they must be exploited. Here too, Chinese leaders had cause for optimism because by any standard their country had achieved steady, even dramatic production increases. The table on the following page illustrates what had been achieved.

TABLE 1
 PRODUCTION OF COMMERCIAL ENERGY 1953-1977

	1953	1957	1965	1970	1974	1976	1977
Raw Coal	69.7	130.0	220.0	310.0	384.0	448.0	550.0
Oil	.62	1.5	10.0	28.2	65.7	83.6	93.6
Natural Gas	.01	.03	n/a	3.7	8.0	10.3	12.5
Electricity	9.2	19.3	42.0	106.7	167.2	203.5	223.4

NOTE: Units are as follows:

Coal, million metric tons

Oil, million metric tons

Natural Gas, billion cubic meters

Electricity, billion kilowatt hours

SOURCE: Chinese government reports and UN statistics

Finally, assumptions about future earnings from oil exports were buttressed by favorable market conditions. The picture on the demand side seemed favorable. OPEC-led price increases, the scramble to find alternatives to Mideast oil, and foreign interest in Chinese fields, where production increases had reached roughly 20 percent per year in the mid-1970s, contributed to the general sense of optimism about the future.

In retrospect it is clear--to the Chinese as well as to outside observers--that the post-Mao leadership had too rosy a view of the country's energy balance. But it is important to point out that they had lots of company. It has been less than a decade since the Arab oil embargo and predictions of impending energy crises forced political leaders around the globe to focus on and learn more about the production, transport, and use of energy. Others also made easy but erroneous projections on the basis of past experience. But the Chinese had--and still face--four special problems in perceiving and responding to the new verities, problems of logistics, history, technology, and politics.

Logistics

China's leaders appear to have assumed that the exploration and exploitation of fuel and power resources would follow the same general pattern as that found in China's recent past or the experience of other nations.

But such reasoning by analogy was misleading. Major producing areas (for example, the giant Daqing [Tach'ing] oilfield and the Kailan coal complex) have been exploited first both because they are located near industrial centers, and, more importantly, because they were easiest to develop. In contrast, most of the larger, untapped reserves, especially hydropower but also oil, coal, and natural gas, are in remote, inaccessible areas. Each new investment will be more difficult, more costly, and more technically demanding. The Chinese will have to face such obstacles as transport over long distances and difficult terrain, removal of heavy overburdens atop coal seams, working in deep water and violent weather in promising offshore areas, and unusually heavy silt loads in major rivers. These problems are not insoluble, but they are certainly more formidable than was appreciated in the 1970s and may be more difficult than China can handle, at least in the short run.

History

The Chinese approach to energy development under Mao shaped the perceptions of his successors in three important ways. The first was a strong faith in self-reliant mobilization. Chinese leaders are justifiably proud of the Daqing oilfield, which is located in a remote and harsh region of the country and which now supplies roughly half of China's annual production. Daqing was built without any foreign assistance. Successes in the expansion of coal mines, development of small-scale hydro and a few large projects, and in tapping Sichuan's rich reserves of natural gas also contributed to the general sense of optimism.

All this suggested that even the most formidable obstacles to further exploitation of known reserves could be overcome. China had scored great accomplishments in the past and could surely do so again, especially since the country was no longer shackled by the infamous "gang of four," or so many leaders thought in 1976-77. For example, officials and media commentaries proclaimed that it was possible to open "ten new Daqings" by 1985.

Second, history constrained as well as misled political officials. The "Soviet model" of economic development, adopted in the 1950s, stressed heavy, energy-intensive industry, and relied on extensive rather than intensive growth. This approach ignored energy efficiencies: efficiency did not matter because fuel and power were underpriced and no competitive or other mechanisms existed to induce efforts to limit costs. As a result, China has hundreds of thousands of aging and energy inefficient enterprises and a deeply ingrained approach to capital investment that makes it

difficult to switch to more efficient, less energy-intensive construction and retrofitting. Moreover, since efficiency mattered little for thirty years, tens of thousands of enterprises continue to operate, even though they waste resources and serve more of a welfare than a production function. (According to official figures more than 25 percent of state-run enterprises operate at a loss.) The technically or economically rational course is clear, but it is extremely difficult to change attitudes, expectations, and behavior, or to close factories that waste energy.

The third historical legacy is the government's near continuous failure to devote adequate attention or resources to the energy and transportation sectors. Despite considerable rhetoric and a few major achievements, construction of mines, oilfields, railways, transmission lines, pipelines and highways failed to keep pace with the growing demand for fuel and power in the cities and rural areas. This failure is particularly striking in a state which advocates central planning and claims an almost religious faith in the advantages of planned development. Decades of neglect cannot be overcome in just a few years.

Technology

The geographical, geological and other logistical factors noted above combine in ways that preclude rapid development of energy resources without substantial infusion of advanced technology; both equipment and know-how. China has done quite well with the technologies acquired from the Soviet Union in the 1950s, but, generally speaking, pushed those technologies about as far as they could be pushed. Tapping deeper oil deposits, opening new mines, and exploring for offshore gas requires knowledge and equipment not available in China. The needs cover a very broad spectrum, from heavy-duty trucks for use in open-pit mines to the computer hardware and software for processing seismic data. Moreover, to make effective use of many items requires simultaneous acquisition and absorption of many others. Almost without exception, the technologies and equipment needed are expensive.

In the giddy days immediately after Mao's death, officials greatly overestimated China's ability to purchase and absorb the new technologies. They wrongly expected to pay for imported technologies with the income from oil exports. They did not count on the constraints imposed by the type of technical training pursued prior to 1966 and by the calamitous effects of the Cultural Revolution (1966-1976). China simply does not have enough skilled managers, engineers, technicians or specialized workers to master numerous new technologies simultaneously. Even with concerted effort it

will take years, perhaps decades, to create the critical mass of skilled people needed to attain China's developmental goals. True in a general sense, these twin miscalculations were--and are--particularly crucial in the energy sector.

Politics

Tapping China's energy resources is complicated by both domestic and international politics. On the domestic side, one finds the same types of regional, bureaucratic, and personal rivalries that bedevil other political systems. Various agencies, interests, and coalitions jostle one another at the budgetary trough and compete for other limited resources. Despite rhetorical homage to "scientific socialism", most decisions are made using political as well as purely technical or economic criteria. Thus, investment must be spread to satisfy many claimants rather than concentrated in an economically optimal way. Short-term demands often overwhelm arguments in favor of technical solutions that might be better only in the long run. In short, energy decisions in China are at least as political as they are in the United States. But the impact of confused and contradictory energy policies is worse in China than in the US because China lacks the moderating effect of myriad private sector decisions.

International politics, or, more specifically, domestic debates over China's foreign policy and the way those debates are shaped by external developments, also affect China's ability to develop its energy resources. The logistical, historical and technical factors outlined above make it imperative for China to rely, at least in part, on foreign assistance if it is to meet its energy requirements. But such reliance is an anathema to some officials and unpalatable to many others. They recall the history of "exploitation" at the hands of imperialist states and foreign companies. As nationalistic leaders dedicated to restoring China's prestige and independence, they view the role of transnational energy companies through ideologically tinted glasses. They are understandably reluctant to allow foreigners to play a direct and central role in the development of so critical a sector as energy. Part of the attractiveness of the 1977-78 strategy of development was that it promised to keep the foreigners at arm's length; they would merely supply equipment and advice.

As officials came to realize that exploiting China's energy resources--and attaining broader developmental goals--would be impossible without substantial foreign involvement, they faced two unpalatable alternatives: (1) the undermining of political legitimacy through failure to produce immediate and tangible economic benefit, or (2) dependence on foreign firms and

governments. One reason it has taken China so long to conclude the first sizeable contracts for development of coal and offshore oil is that officials are unwilling to make politically risky decisions. They fear, with good reason, that support for foreign involvement (that is, "underestimating China's potential" and "selling out to the capitalists") might come back to haunt them.

Involving foreigners effectively and absorbing advanced technologies raise other political issues as well. Current efforts to "readjust and reform" the economy are linked to the effort to achieve greater energy (as well as economic) efficiency and they tread on deeply entrenched interests. Aggrieved or endangered interests (e.g., inefficient factories, and local Party leaders in relatively disadvantaged areas) mobilize support and use every political tool available to alter decisions they do not like. This has had, and will continue to have, a major impact on the implementation of energy policy.

CURRENT POLICIES AND PRIORITIES

Confronted with this complex mixture of opportunities and difficulties, China's leaders have moved, albeit by fits and starts and with a degree of trial and error, to formulate integrated, comprehensive and effective energy policies for the entire nation. After decades of neglect, the energy sector has been accorded high, if not highest, priority. Although the military still commands the lion's share of the budget and agriculture retains rhetorical preeminence, investment in energy production and distribution is at an all-time high, and energy considerations are central to the evaluation of all capital construction projects. Implementation has lagged behind the articulation of energy policies and, naturally, individuals and organizations have interpreted guidelines to accord with their own wishes. However, generally speaking, China appears to be moving in a sensible direction. Cataloging the dozens of specific measures adopted is less useful than describing the four fundamental elements of Chinese energy policy: conservation, concentration, cooperation, and coordination.

Conservation of Existing Resources

Chinese fondness for the slogan of "walking on two legs" has continued into the post-Mao era. Under that rubric officials now proclaim the need to pursue both exploitation (i.e., greater production) and conservation of energy. They immediately add, however, that production cannot be increased significantly in the short term and that primary emphasis must be placed on conservation through more efficient use of the energy

that is produced.

Official pessimism about the ability of China to produce more energy has been justified by recent statistics showing little or no growth. Even allowing for the inaccuracies that almost certainly exist in Chinese statistics, the trend is clear and stands in sharp contrast to that of the early 1970s as is shown by Table 2.

TABLE 2

PRODUCTION OF COMMERCIAL ENERGY, 1976-1981

	1976	1977	1978	1979	1980	1981
Raw Coal	448.0	550.0	618.0	635.0	620.0	620.0
Oil	83.6	93.6	104.0	106.0	106.0	101.0
Natural Gas	10.3	12.5	13.8	14.5	14.3	12.7
Electricity	203.5	223.5	256.6	282.0	300.06	309.3

NOTE: Units are as follows: coal, million metric tons; oil, million metric tons; natural gas, billion cubic meters; electricity, billion kilowatt hours

SOURCE: Chinese government reports and United Nations statistics

References to energy shortages began to appear in China's media in early 1977 but officials and commentators did not highlight their magnitude or seriousness until 1979. The following excerpt is typical of many articles and speeches published in the past three years:

China possesses extremely abundant energy sources, but there are serious problems in the field of energy supply. Due to shortages of fuel and electric power, many enterprises are unable to operate at full capacity. This affects the speed of development of the national economy. It is not possible to fully meet the fuel and power needs of the people in urban and rural areas. This affects normal life. The energy problem is therefore a problem which we must take urgent steps to solve.

Officials signalled the importance they assigned to alleviating the consequences of energy shortfalls through conservation measures by proclaiming November 1979 the "first nationwide energy conservation month." To launch the campaign to conserve energy, Kang Shi'en,

then minister of the state economic commission, outlined the magnitude of the problem and identified the areas of greatest concern. Even allowing for the hyperbole and use of extreme examples common to such PRC statements, the following passage provides useful insight into the thinking of senior officials.

Why do we particularly stress energy conservation at present? As everyone knows, due to interference and sabotage by Lin Biao and the gang of four, the management of energy is now in a state of confusion, the effective energy utilization rate is very low, and wasteful losses of coal, petroleum, and electricity are frightening. China now consumes forty-to-fifty million tons more coal, three-to-four million tons more oil, and twenty-to-thirty billion kilowatts more electricity than is necessary each year. This waste is even more shocking when compared with the effective energy utilization rate in advanced foreign countries. In China the effective utilization rate of thermal energy derived from fuel is only about 28 percent, while in the developed countries it has reached around 50 percent, almost double ours. . . . We are consuming too much petroleum and not conserving our natural resources in a rational way. Various enterprises on the industrial and communications front are now consuming over thirty million tons of oil. Over ten million tons of this petroleum are consumed directly. Most of the direct consumption of oil may be eliminated through using coal. If we can save over ten million tons of petroleum for export, we can earn more than two billion US dollars in foreign exchange a year. We really cannot afford the consumption of oil in this manner.

To implement the call for energy conservation, departments and localities were instructed to prepare concrete plans to reduce wasteful consumption. Enterprises must monitor the amount of fuel and power used and strive to reduce consumption per unit of output. Inefficient factories will be penalized, presumably by having their allocations of energy reduced, and those able to use energy most efficiently will be given additional supplies if the addition will enable them to operate at higher capacity. This is in keeping with a general shift to what are termed "economic methods." Other conservation measures include retrofitting plants as part of the emphasis on tapping the full potential of existing enterprises, the introduction of "modern" principles of management and techniques associated with systems engineering and operations research, and closer monitoring of energy consumption.

To conserve oil, oil-burning industrial boilers are to be converted to burn coal. Current policy specifies that "all" oil-fired boilers must be converted and no new ones may be constructed except in extraordinary cases. Reasons for making such a change include freeing more oil for export, other forms of domestic consumption, and for taking full advantage of China's large coal reserves. But there are also costs and problems associated with this policy. For example, increased use of coal will require additional transport capacity, opening and/or expanding mines, and greater attention to pollution problems--not to mention the direct costs of conversion. Thus far, officials seem to be paying little attention to these implications.

Concentration of Investment

Another Maoist aphorism adopted by his successors is to "concentrate resources to fight a war of annihilation." They have construed this injunction to mean that available resources (human, fiscal, technical, etc.) must be dedicated to the construction of a relatively small number of projects that can be completed quickly and will produce tangible and immediate benefits. Applied to energy decisions, this approach has produced three notable developments.

The first and most significant development is increased investment in the energy sector. Despite substantial reduction in expenditures for capital construction, the amount and percentage of funds earmarked for energy production (and conservation) have climbed to an all-time high. Having identified energy shortfalls as the principal obstacle to realization of economic, social, and political goals, officials have made the politically difficult decision to shift resources from other sectors with aspirations, requirements, and supporters of their own.

Not only have resources been concentrated more heavily than heretofore in the energy sector; within that sector they have been concentrated in relatively few facilities. In order to bring new facilities on line as quickly as possible, the number of concurrent projects has been reduced sharply in the past three years. More care than in the past is being devoted to the evaluation of alternative projects to ascertain the optimal sequence of development. Existing facilities will be expanded and modernized before new ones are built if doing so will produce better results in the short run.

Principles and priorities guiding the retrofitting of existing facilities to conserve energy are similar to those guiding new construction. Since industry consumes more than 70 percent of all commercial energy in China, and since the chemical, petrochemical, and metallurgical

industries account for most of that figure, initial efforts are directed at the biggest sources of waste in these major consuming industries. This approach has certain clear advantages but it is also quite new in China where it has been far more common to dissipate resources in order to "do a little for everyone at the same time."

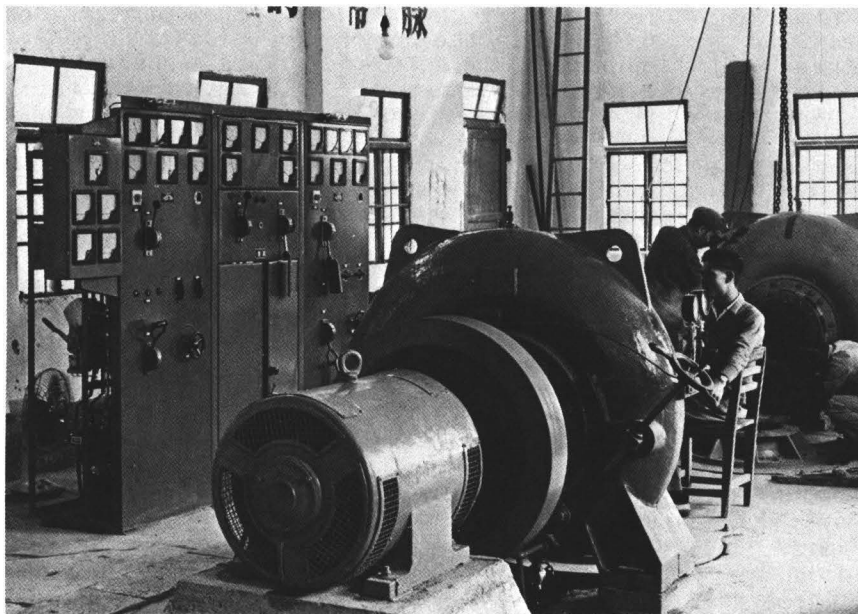
Second, the general economic policy of "readjustment" serves to concentrate investment in ways that affect the energy sector. A key component of that approach has been to shift resources and emphasis from heavy to light industry. One frequently proclaimed reason for doing so is that light and textile industries consume far less energy per unit of production than do heavy industries. Reducing the targets and operating time of one heavy industrial facility "frees up" enough fuel and power to supply several light industrial plants. The latter generate higher profits, produce goods needed to satisfy rising consumer demand at home, and earn foreign exchange from exports.

Concentrating resources in this way has raised the productivity of energy inputs, but it has also infringed upon the interests of powerful groups. These include representatives of the defense industries and their allies in the military, centers of heavy industry such as Shenyang and Anshan, and officials linked by factional ties and logrolling arrangements. These political forces--Nikita Khrushchev used to refer to their Soviet counterparts as "steel eaters"--will no doubt make new claims on the country's fuel and power in the near future.

Finally, the energy supplies produced under central direction will be consumed primarily in the cities. Since total energy production will grow slowly and demand in the urban and industrial sector will steadily increase, the supply of commercial energy to the rural areas will not increase significantly during the remainder of the decade. Consequently, the ambitious plan to mechanize agriculture by 1985 has been abandoned. Even if there were no other obstacles (which of course there are), the energy requirements (diesel fuel, electricity, gasoline) would be prohibitive.

There is a sense in which the 800 million people living in the countryside are being told that they must once again defer to the needs of their urban cousins, but there are significant differences between present policies and past neglect of the rural areas. For the first time in PRC history, the central government appears to be making a substantial effort to help the villages to help themselves in the energy field.

As part of this effort, investigation teams have surveyed the potential energy resources, capabilities, and needs of all (approximately 2,000) rural counties to determine, among other things, the potential for



An electric generator on a South China commune (National Council for US-China Trade)

development of small hydrogenerators, local coal pits, biogas, solar energy, and fuelwood. Recognizing the impossibility of formulating detailed plans for 2,000 counties, the energy research institute (subordinate to both the state economic commission and the Chinese Academy of Sciences) has assigned each county to one of twenty-six categories or "zones." Counties in the same zone have the same general mix of resources and requirements. When the process of analysis and clarification has been completed, central officials will formulate twenty-six rather than 2,000 specific rural energy policies. Small hydro projects will be encouraged in some counties, for example, while tapping natural gas deposits will be promoted in others. The allocation of funds, assignment of skilled personnel, and development of local industries will be made accordingly.

Cooperation: Foreign and Domestic

After years of delay and agonizing efforts to find an acceptable alternative, China's leaders have finally begun to sign major contracts with foreign firms for the development of energy resources. At the same time, the government is encouraging cooperation across formerly hermetic administrative boundaries within China. Both

forms of collaboration have encountered political resistance.

Domestic opposition to foreign involvement is fueled by economic concerns as well as chauvinism. Investment in the development of energy resources is, to some extent, a zero-sum game. Some regions, industries, and enterprises will benefit from joint projects with foreign partners while others will be disadvantaged, at least in the short run. Those with something to lose have joined those opposed to foreign involvement on ideological or xenophobic grounds. Politics is omnipresent. By mid-1982, however, Deng Xiaoping and his allies had converted, neutralized, or removed enough of those opposed to foreign involvement to clear away the remaining obstacles.

Willingness to permit major energy companies and foreign governments to participate in the search for and exploitation of China's energy resources is neither a sudden development nor an invitation to foreigners to write their own ticket. While combating and conquering domestic opposition, key officials (e.g. Deng, Zhao Ziyang, Hu Yaobang, and Yao Yilin) and legal, technical, financial, and other specialists have been preparing the way for restricted but effective foreign investment in the energy sector. Preparation of the joint venture, corporate income tax, petroleum, and other laws; decisions as to how and where foreigners will be allowed to invest; and analysis of how to reap maximum benefits from training, technical information, sale of equipment and support services has proceeded slowly but steadily during the past three years. Hence, when it became politically possible to invite the foreigners in, it was also technically possible to do so. These developments are not unrelated; it is likely that political opposition diminished as safeguards were devised.

Cooperation within the country is at least as significant and as fraught with political controversy as allowing foreigners to invest in and operate mines and oilfields. The government is promoting a variety of new (for China) ways to induce joint projects between different administrative and functional units, in order to best utilize scarce investment funds. For example, provinces with limited or low-quality deposits of coal have been urged and enabled to invest in the development of mines located in other provinces. They do so with the promise of reaping economic benefits (e.g. equipment sales and a return on investment) and guaranteed energy supplies. At lower levels of the system, new ways are being tested to facilitate cooperation among villages (teams, brigades, and even communes) in the same river basin or astride the same deposit of coal.

As reasonable as it seems, the policy of encouraging domestic cooperation faces several obstacles. For years, farms, factories, and administrative units were

urged to be self-reliant: their willingness to be so was reinforced by traditional rivalries and the perils of depending on others. As a result, cooperation was problematic and infrequent. Better guidance, better leadership, and material incentives are now seen as critical to overcoming the attitudes and behavior of the past. It is too soon to declare current policies a success, but, again, they are a step in the right direction.

Improved Coordination of Policy Implementation

To formulate and monitor their new energy policy, PRC leaders decided in 1979 that China needed a new superministerial body. By the time the establishment of the state energy commission was formally announced in May 1980 it had existed for at least six and possibly ten months. The new commission was headed by Yu Qiuli, a vice-premier and former head of the state planning commission, who had acquired fame and influence as the military commander in charge of opening the Daqing oilfield.

Ironically, however, the energy commission was created at a time when Yu's approach to energy development (which underlay the developmental plan announced in early 1978) had been discredited and largely abandoned. The energy commission failed to achieve the desired results, in part, because Yu did not share the goals and assumptions of the leaders who demoted him to his new position and because his nominal leadership of the commission undermined its authority and effectiveness.

But that is a separate story. The important point here is that China's leaders saw the need to achieve greater coordination among energy ministries (petroleum, coal, and electric power) and to focus attention on the energy implications of the plans and practices of all other ministries and subnational administrative jurisdictions. They also sought to overcome paralyzing political maneuvers by creating a new organization with clearer authority and fewer parochial interests; in fact, they succeeded merely in changing the locus of debate on energy issues.

Even though the energy commission was abolished in May 1982, the priority given to coordination has persisted. For example, one of its subordinate units, the energy research institute (now subsumed under the the state economic commission and the Chinese Academy of Sciences) was assigned the task of reviewing the energy impact of all capital construction proposals submitted to the state planning commission. Its analysis was supposed to eliminate projects which could not be supplied with adequate fuel and power without depriving other consumers or requiring ancillary investment in new

generating capacity, pipelines, etc.

Overall responsibility for formulating the energy sector plans and coordinating projects to ensure adequate supplies of fuel and power now rests with the state planning commission and the state economic commission. The evidence to date suggests that considerable progress has been made toward overcoming energy bottlenecks caused by unplanned or poorly coordinated construction and operation of industrial enterprises. Better coordination has also been achieved through the reemerging of the former ministries of water conservancy and electric power (both of which had constructed hydro facilities). The major restructuring of state agencies undertaken in the spring of 1982 should also enhance coordination of energy policy. With fewer organizations, fewer layers of bureaucracy, and fewer redundant functionaries, project review and approval procedures will be simplified and, it is hoped, lead to greater efficiency.

The tenor of economic policy in general facilitates coordination in energy development. Provincial, municipal and enterprise officials are on a shorter leash when it comes to beginning new projects. As a result, there has been a sharp reduction in the amount of new construction, which, in turn, has slowed growth of energy demand.

Several additional steps have been adopted to enhance coordination. Provincial governments and Party committees have been instructed to establish special groups to oversee energy-related matters and to assign clear responsibility for the implementation of energy policies. Regulatory mechanisms are henceforth to be supplemented by a type of outside review effected through the various branches and arms of the People's Bank. More investment capital is to be allocated through loans approved and monitored by agencies of the Bank than through direct grants from central ministries. Before approving any loan, Bank cadres are supposed to review projects to ensure that requisite supplies of fuel and power will be available. There are reasons to question the ability of Bank personnel to conduct thorough reviews of all projects, but this is another step in the right direction.

Coordination does not just mean centralization, however. Indeed, separate corporations more independent of central ministerial control have been established to perform specific functions. Some of these corporations have entered into joint ventures with foreign firms; the China National Offshore Oil Corporation is an obvious example. Moreover, even as the government has tightened planning and control over critical sectors of the economy, it has allowed market mechanisms to operate more freely in secondary areas. This should lead to better energy planning and policies by enabling

the small band of overworked statisticians, analysts, and planners to focus on fewer projects and relationships.

PROSPECTS

China's leaders have undertaken nothing less than the total restructuring of their economic system. Energy plays a key role in their approach and success or failure in the energy sector will strongly influence, perhaps even determine, the outcome of the broader effort. What are the prospects of success on the energy front? What are the implications for the United States?

If left in place long enough, the general approach and specific policies concerning energy now dominant in China could, perhaps will, produce the desired results. On balance, the policies are both appropriate and sound; the unaddressed and unanswerable question is whether or not they will produce enough tangible benefits fast enough to satisfy skeptics, opponents, the public as a whole, or even key supporters.

If one were to predict the future on the basis of China's recent past, the inescapable conclusion is that prospects for policy continuity are not very good. Leaders and constituents eager for dramatic advances have repeatedly demonstrated impatience with policies that "worked" but are too slow. Given the visibility and inherently political character of current economic policies, including those dealing specifically with energy, it seems certain that those who fare relatively badly under policies now in place will do what they can to force change. Rising expectations among the leadership as well as the rural and urban populace will inevitably lead to increased demands and reduced willingness to delay gratification in the name of abstract goals or the larger good. These pressures will be aggravated by demography and disenchantment with Marxism, the Communist Party, and contemporary Chinese society. Cynicism and the implicit question, "What has the Party done for me lately?" undermine the authority of the regime and individual leaders. To restore lost legitimacy, current policies must succeed. If success comes too slowly, current leaders may be tempted to experiment with other alternatives in an effort to substitute motion for movement and to buy more time for themselves.

Though possible, the above scenario is probably less likely than one of basic policy stability with continuous adjustments at the margins, and with intermittent removal of scapegoats who can be blamed if policies fail to deliver as much or as quickly as people have been led to expect. Perhaps the strongest reasons for assuming such continuity are that the approach is unlikely to fail miserably and that there are no ready

alternatives. Weary of unsuccessful experimentation and eager for sustained, predictable, and "sensible" policies, a significant portion of the public is likely to support continuity and to "give the leaders and their approach more time." As long as things do not get worse, they need not improve dramatically to satisfy "the masses." Ironically, greater participation in the world economy and a larger role for transnational and foreign government-owned energy companies will increase pressures favoring preservation of the status quo.

Without substantial policy stability, China will not be able to exploit its rich energy resources fast enough to satisfy growing domestic demand or to provide revenue-generating exports to finance imports of grain, equipment, and technologies needed to prevent slipping even further behind the advanced and rapidly modernizing states with which China wants to be compared.

China's energy balance will not improve significantly during the 1980's. Projects initiated in 1982-83 will not come on line until the latter part of the decade; when they do, output will barely meet increased domestic demand. Even if offshore deposits prove as rich as many hope, China probably will not earn much additional foreign exchange until well into the 1990's because it will need to retain its share of the output for domestic use. It is possible, especially if efforts to locate oil offshore prove unsuccessful, that China might have to import small quantities of oil during the 1980's.

For many reasons, the United States and American corporations will play a central role in the development of China's energy resources. Many technologies and much of the capital needed to locate and exploit deposits of oil, coal, and natural gas must come from the United States. For better or worse, China is going to become more dependent on US firms and its political relations with the United States will become hostage, up to a point, to these economic and energy relationships. Similarly, the US government can be uniquely helpful in the development of China's hydroelectric potential. The government-to-government agreement for cooperation in hydroelectric power and related water resources and the annexes agreed to and currently under negotiation could be extremely helpful to the Chinese and very profitable for American firms.

Should relations between Washington and Peking deteriorate significantly at some future point, it is unlikely that American firms would undertake new energy development projects. Depending on the outcome of President Reagan's attempt to block the sale of equipment embodying US technologies to the Soviet Union for use in constructing the natural gas pipeline to Western Europe, American firms may find it undesirable

to operate in China and China might treat American firms as suppliers of last resort.

While it is true that deterioration of official relations between China and the United States could, probably would, interfere with the development of China's energy resources and realization of its broader economic, social, and political goals, both sides recognize how undesirable that would be. At some point which is likely to be reached relatively quickly, increased energy ties will strengthen and add to the stability of the political relationship.