

Foreword

Aaron Frank, Editor

In an October 1995 comment to President Jiang Zemin, President Bill Clinton suggested that the greatest threat China presented to American security was environmental, not military. President Clinton's remark raises environmental issues to the priority level of economic interests, human rights concerns, and Asian security issues. China's continual growth — in economic, demographic, and military terms — has already made it an important player in international politics and trade. Due in large part to these changes, the PRC's concurrently increasing environmental problems — with both domestic and global impacts — has made it a major player on global environmental issues and agreements. In this light, the Environmental Change and Security Project has created the Working Group on Environment in U.S.-China Relations and this *China Environment Series*. These fora are designed to facilitate discussion on environmental issues in China, determine how the United States can most fruitfully engage China on the environment, and explore the means by which government agencies, non-governmental organizations (NGOs) and private businesses can best work together to assist the Chinese in addressing future environmental dilemmas.

This first issue of the *Series* opens with an article by Kenneth Lieberthal, which provides the reader with a foundation for understanding Chinese environmental problems: any U.S. or multilateral effort to assist the Chinese on the environment must take into consideration the Chinese political economy and issues of environmental implementation and enforcement. Elizabeth Knup describes environmental NGOs in China and how they work within Lieberthal's political context. Knup's article also provides insight into how the Chinese people are developing a new form of civil society and utilizing close ties to the government to benefit the environment. Building on the working group's concentration on energy issues during its first six months, Michael May and Yingzhong Lu focus on future energy scenarios and Chinese nuclear power development, respectively. May hypothesizes that Chinese energy demand, under a no-surprise scenario, will match U.S. demand by 2050 and analyzes what problems these demands might create for the Chinese. Lu provides an environmental argument in favor of nuclear power expansion in China, focusing on its benefits for carbon dioxide mitigation. The next issue of the *Series* will include a perspective opposing Chinese nuclear power expansion. In an effort to learn more about the accomplishments of international fora on the environment with China, Earl Drake describes the successes and goals of the China Council for International Cooperation on Environment and Development (CCICED) in this inaugural issue.

Several other items will appear in each issue of the *Series*: summaries of working group meetings and small group sessions, an inventory of government and non-governmental work on the environment in China, a listing of upcoming conferences on the environment in China, and a bibliographic guide to the relevant literature. The inventory, conference section and bibliography are all working documents: we would appreciate greatly your contributions to help make these sections as comprehensive as possible. You may use the perforated sheet at the back of this issue to mail us your updates or requests. In addition, I would also like to direct you to our web site at <http://www.ecsp.si.edu>. This site will constantly be updated to include new meeting summaries, conferences and other relevant information.

Lastly, I would like to thank our funders, the National Oceanic and Atmospheric Administration, the Summit Foundation, and the W. Alton Jones Foundation for their support. I would also like to thank working group co-chairs Elizabeth Economy and P.J. Simmons, and the Wilson Center's Asia Program, whose assistance and guidance have been central to working group activities and the publication of this *Series*. I hope you find this issue useful, and we look forward to receiving your comments and suggestions.

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China's Governing System And Its Impact on Environmental Policy Implementation

By Kenneth Lieberthal

THE PEOPLE'S REPUBLIC OF CHINA (PRC) PRESENTS A PARADOX. ITS leaders are aware of its enormous environmental problems; impressive environmental laws and regulations have been adopted; a dedicated environmental bureaucracy extends from Beijing down through the provinces, cities, and counties to the township level; and China participates actively in the global environmental community. Yet, much of the environmental energy generated at the national level dissipates as it diffuses through the multilayered state structure, producing outcomes that have little concrete effect.

To understand how to work with China to improve environmental outcomes, one must appreciate the systemic dynamics that contribute to the disjuncture between the PRC's promise and its performance on environmental issues. Two factors—the distribution of authority and the structure of incentives—are particularly consequential.

I. Distribution of Authority¹

China has a multilevel political system in which the major territorial levels are: the *Center*, covering the entire country; thirty-one *provinces*; more than six hundred *cities*; over two thousand *counties*; nearly one hundred thousand *townships*; and close to a million *villages*. [See Chart #1] Typically, every office in the Chinese system has a bureaucratic rank assigned to it. One territorial level of government² contains within its organs several bureaucratic ranks. For example, in the national government in Beijing the State Council (China's cabinet) is at the top;³ commissions such as the State Planning Commission are one step down; ministries are an-

other step down; bureaus within ministries are yet another step down; and so forth.⁴ Provincial governments are the same bureaucratic rank as ministries, and provincial bureaus share the same rank as their ministerial counterparts. [See Table #1]

One key rule of the Chinese system is that *units of the same rank cannot issue binding orders to each other*. Operationally, this means that no ministry can issue a binding order to a province, even though on an organizational chart it appears that the ministries (which are at the Center) sit above the thirty-one provinces.⁵ The natural consequence of this operating rule is that there often is a tremendous need to build a consensus in order to operate effectively in China, and negotiations aimed at consensus building are a core feature of this system.⁶

Authority is channeled (or fragmented) by function as well as by rank. Chinese officials speak of

their government as being divided into broad functional "systems" (the Chinese term is *xitong*), so that each ministry sits atop a functionally-defined hierarchy of government units that exist at each territorial level of government. The National Environmental Protection Agency (NEPA), for example, is at the top of a hierarchy of EPAs⁷ at, respectively, the township, county, city, and provincial levels. Typically, each of these specialized organs has at least two potential masters: the government at each organ's own territorial level of the system and the office in the same functional sphere one level "up" the territorial hierarchy (e.g., the Hunan Provincial EPA is under both the Hunan Provincial Government and NEPA). [See Chart #2]

There is an obvious potential conflict between the "vertical" lines (in Chinese, *tiao*) of authority (e.g., the EPA at each level of the political system) and the "horizontal" lines (in Chinese, *kuai*) of authority (emanating from the territorial government at the same level as the functional office). The former coordinates according to function (in this example, environment); the latter coordinates according to the needs

Chart 1: Territorial Layers of State Administration

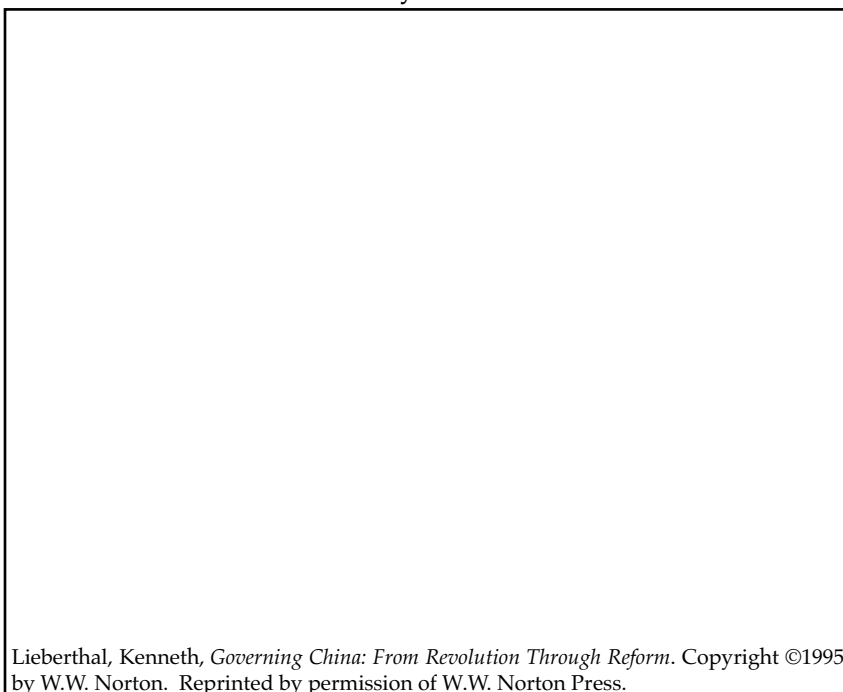


Table 1: Rank Equivalents among Government Organs

Lieberthal, Kenneth and Michel Oksenberg, <i>Policy Making in China: Leaders, Structures, and Processes</i>. Copyright© 1988 by Princeton University Press. Reprinted by permission of Princeton University Press.

of the locality that it governs. While specifics vary, generally one of the most notable thrusts of the reforms since the late 1970s has been to give the horizontal (that is, the territorial coordinating) line of authority priority over its vertical counterpart. The Chinese call this "Making *tiao* serve *kuai*." The result is that, in general, territorial governments have become more powerful and the central-level functional units such as ministries have had their wings clipped. Within each territorial government, moreover, typically there is one top person (called a "governor" at the provincial level) and several deputy heads. Each of

the deputy heads has formal responsibility for a specific array of functional offices, and a deputy head is not allowed to interfere in the affairs of functional offices outside of his/her prescribed jurisdiction.

As even the above simplified review suggests, authority in China is fragmented by function, by territory, and by rank. Specifics may vary, but it is important to "map" the lines of authority that apply to the implementation of any specific environmental policy in any given locality. It is easy, for example, to end up speaking to a vice mayor of a municipality who in fact has no

authority over the specific issues that are on the agenda of the foreign visitor.

II. Incentives

Relations among territorial governments are complex and important. Typically, all communications go up and down the national hierarchy level by level; skipping levels (by, for example, having the Center communicate directly with a county) is not the norm. In addition, formally each territorial level of government is permitted to issue binding orders to the territorial governments within its jurisdiction one level "down" the national hierarchy. But an implicit political/economic deal developed under the reforms has vastly complicated this straightforward operational rule.

China's reform leaders recognized early on that they had to find some way to spark the genuine enthusiasm of territorial leaders at all levels if they were to succeed in their quest to jump start the Chinese economy and transform it, over time, into a technologically dynamic, efficient engine of growth. Simply issuing orders from Beijing would inevitably produce huge errors and crushing rigidity in a country as large and complex as China. Yet, leading officials did not want to give up ultimate control. The solution to this quandary, reached through experimentation and never codified in either law or specific documents, is a national political-economic deal which says, essentially: *each level of government will grant the level just below it sufficient*

Chart 2: Allocation of Authority



flexibility to enable the lower level to grow its economy rapidly enough to maintain social and political stability. Rapid economic growth, accompanied by social and political stability, is, in turn, rewarded with promotions and other benefits.

This underlying national political/economic deal has produced dramatic results. It has provided enormous incentives for key officials in each locality to become entrepreneurial — to find opportunities to maximize economic growth in the territory under their jurisdiction. Officials at all levels of the political system have become increasingly adept at negotiating for additional flexibility from those at the next higher level — or of concealing activities that violate restrictions imposed from above.

China has thus become a highly negotiated political system. At each territorial level, officials retain enormous ability to interfere in the affairs of the territorial governments one level down the national hierarchy that are under each officials' direct jurisdiction. The officials can stop almost anything they wish to bring to a halt. Therefore, at every level key officials spend an enormous amount of time negotiating for additional flexibility and trying to devise ways to keep higher levels from becoming overly restrictive. This is a bargaining game in which economic growth and social and political stability are the chips at stake.

This situation has had particularly interesting results at the township level. Townships amount to small cities, and they are absorbing a good deal of the surplus labor that has been leaving the land since the breakup of the rural communes in the early 1980s. Township and village enterprises have been the most dynamically growing sector of the Chinese economy for more than a decade, providing a substantial portion of the impetus for the economic miracle widely associated with China over that period.

Township governments do not

receive a regular budgetary allocation from higher levels of the state apparatus. Rather, they rely primarily on generating their own operating funds, and many township leaders have their remuneration tied more or less directly to the profitability of township enterprises.

Although formally considered collectives, the township enterprises are usually creatures of the township government itself. The local government may appoint the enterprise's managers, specify the business scope, provide the access to credit, facilitate the marketing, determine the size of the labor force, and keep the profits, among other activities, for each of the township enterprises under its jurisdiction. Although government and enterprise appear separate it is more realistic to regard the two as a joint local territorial corporation, with the township government serving as the corporate headquarters and the enterprises serving as the various business arms. [See Chart #3] A major purpose of the local government is to make the territorial economy grow rapidly so as to maximize income, employment, and stability.

The above description of the township level requires various modifications as one shifts either "down" to the village level or "up" to county, city, and higher levels of the political system. But many of the most basic features remain quite

similar, such as:

- Key officials see themselves as both government administrators and entrepreneurs;
- There is massive official involvement in the economy at all levels;
- Enterprises enjoy few secure property rights that protect them from official intervention; and,
- There are pervasive incentives to produce rapid economic growth.

The above characteristics do not bode well for implementation of environmental policy. Given the lines of authority and the incentives in China, the entrepreneurs (local territorial officials) typically control the regulators (local environmental officials). Some entrepreneurs are personally environmentally sensitive, and in some localities tourism or other environment-related activities are crucial to the economy. But in most cases, this combination goes far toward explaining the paradox of good environmental laws and poor environmental performance that is pervasive throughout China.

There are additional ways in which this basic structure and set of incentives inhibit effective implementation of environmental policy. "Local corporationism," the name I am ascribing to the nexus between government and economy at the township level, means that various localities tend to become inward

Chart 3: Local Corporationism



looking and regard each other as competitors. But most environmental problems travel across local boundaries and require the cooperation of various territorial governments to address effectively. Such cooperation is difficult to achieve: indeed, there is some evidence of purposeful activity to benefit a locality at the cost of a neighbor's well being. For example, after China imposed water discharge fees for adding pollutants above permissible levels to rivers and streams, there was noticeable movement of offending enterprises to the downstream boundaries in various townships and counties.

The strong incentives to expand local employment and generate new wealth mean that the local government may conspire to blunt the effectiveness of disciplinary actions initiated by its own environmental organs. There are documented cases, for example, of a local EPA imposing a fine on a large local enterprise and then passing along the amount collected to local government coffers; the government then provided a tax break to the enterprise roughly in proportion to the amount of the fine that had been levied. In this way, the EPA met its responsibilities by imposing the fine and the government met its responsibilities by maintaining the financial health of an important source of local jobs and income. Only the environment lost out in this scenario.

Some research suggests that China's large state-owned enterprises may be more effectively subject to government environmental controls than are the local enterprises under the country's new political economy. But the state-owned enterprises are under increasing pressure to issue stock and to separate themselves from government administrative dictates. This rapidly growing trend may, in turn, mean that increasing numbers of firms are slipping into the "neither state nor private" status that has proven so difficult to subject to

the discipline of environmental regulations.⁸

III. Central Power and Its Limits

The above comments might create the mistaken impression that higher levels of government in China retain little clout in this political system. That is decidedly not the case. China remains an autocracy, albeit one committed to economic reform and increasing interaction with the international arena. Among the levers that the center has available to enforce its priorities, the following are particularly important:

- Appointments to all top positions are made by the leaders one level "up" in the hierarchy. The Center thus appoints all provincial governors, vice governors, and party secretaries, while the provincial leaders make comparable appointments at the next level, and so forth. No leader is secure in office if s/he raises the ire of leaders at the level directly above. Perhaps to highlight this ongoing vulnerability, tenure in top provincial positions typically is shorter than the mandated term of office for those positions.⁹
- The Center must approve loans from all international financial institutions before those funds are made available for local projects.
- The Center establishes the regulatory environment, including granting exemptions from specific regulatory requirements.¹⁰ Even though localities often find ways to soften the edge of regulatory demands, local leaders nevertheless fear adverse regulatory rulings and lobby hard to gain regulatory relief from upper levels.¹¹
- The Center controls investment approvals for large projects, which can have significant economic repercussions for various localities.¹²
- The Center can employ the organs of coercion — the Public Security and State Security forces on the civilian side, plus the military — to bring recalcitrant localities into line.
- The Center can dispatch work

teams (the Chinese term for what in the United States would be termed "strike forces") into localities to investigate irregularities, remove offending officials, and clean up problems. Local leaders work hard to avoid the type of attention that might trigger investigation by a higher level work team.

Given these prerogatives in the hands of the Center (most of which also apply to the ability of each successive level of government to exercise leverage over its immediately subordinate level), how is a balance struck between "top — down" discipline and local flexibility and entrepreneurship? There is no hard-and-fast rule that adequately answers this question. China at this stage in its history is simply highly dynamic, consciously experimental, poorly institutionalized and therefore quite diverse.

In broad terms, though, the Center can generally obtain high levels of reasonably disciplined compliance when three conditions are present:

- All top leaders agree on the issue;
- All top leaders are willing to give the issue priority; and,
- The degree of compliance of lower levels is measurable.

In the presence of these three conditions, lower level authorities know that failure to comply will bring substantial punishment, including the possibility of being fired. In these circumstances, compliance is usually impressive, as witnessed by China's extraordinary birth control effort. But only very few policy issues meet all three of the above conditions. Most environmental policies, for example, are too complex, long term, and deeply enmeshed in competing economic interests to be effective. They do not provide the kind of clear-cut priority at the top, and measurable performance evaluation at lower levels, required in the above explanation.

Where the above conditions are not met, policy implementation is

more uneven. When top leaders turn their attention to the issue and publicize their concern about it, local officials tread more carefully. When the attention of those at the top shifts elsewhere, compliance levels may quickly fall off.

The institutionalization of policy initiatives, therefore, is particularly important. Given the pervasive bureaucratic nature of the Chinese system, new initiatives fare best when specific units are created (or adapted) and concretely tasked with implementing that particular initiative.¹³ This has been done with environmental policy, as attested by the development of a nationwide apparatus of environmen-

Cooperation with authorities at the Center will not be adequate to produce substantial outcomes in environmental efforts.¹⁴ Efforts at the Center are crucial in that central level opposition (or, for that matter, opposition at any higher level) can kill an initiative, but rarely are such efforts in themselves sufficient. Rather, it is also important to cultivate understanding and support in the localities whose actions can make a significant difference. The Center places so many demands on localities that local leaders effectively have some ability to prioritize their compliance. Foreign efforts may move some environmental issues higher up the list of local pri-

sive. In addition, given the Chinese side's short term focus on making money, it is often important to devise approaches that sharply limit any downside risks.

In China, as in many more democratic countries, it is important to develop coalition strategies. China is in most instances a consensus building system. The fragmentation of authority outlined above means that most major initiatives require the cooperation of people in a situation in which no single official has command authority over each of the important participants. Put differently, a winning strategy in China must take account of the various units or individual officials

Most environmental policies are too complex, long term, and deeply enmeshed in competing economic interests to be effective.

tal offices from the top to the bottom of the system.

It is important, though, to ask about reporting lines as well as the mere existence of dedicated offices. In the case of the environment, as noted above, the EPA at each level has a solid line relationship with the territorial government at that level and only a dotted line relationship with the EPA one level up in the national government hierarchy. This structure of authority effectively puts each EPA under the thumb of precisely the officials who have the greatest responsibility for — and interest in — accelerated development of the local economy. Environmental policy implementation inevitably suffers accordingly.

IV. Recommendations for Environmental Assistance

The above analysis has significant implications for foreign approaches to China's environmental problems. Details inevitably must vary according to the specific nature of the issue under consideration and the part of the country in which a remedy is sought. But several broad lessons warrant attention.

orities.

Foreigners must take care to understand the division of responsibility in each location. If talking with a vice governor, for example, it is important to know whether that particular individual actually has responsibility for environmental issues (or for energy or whatever specific project is under discussion).

In most localities, there is overwhelming pressure to expand the local economy rapidly. That pressure comes not only from above (those officials who are successful generally enjoy both higher standards of living and better prospects for promotion), but also from below. For example, research has determined that one of the strongest driving forces of local elections in China's villages has been the desire by peasants to put into place local leaders who are more entrepreneurial and therefore better able to expand the local economy.¹⁵ Approaches to local officials must seek, therefore, to tie environmental improvements to short term economic growth. Promises of long term benefits at the cost of near term growth are unlikely to prove very persua-

whose opposition could effectively stymie an initiative and develop an approach that assures their neutrality, if not their active cooperation.

China's system is one that creates ongoing negotiations among its various officials and offices. Foreign partners do best if they make the effort to understand these behind-the-scenes negotiations and to work out how they can most helpfully contribute to the negotiating effort of their Chinese counterparts.

China's concentration on economic development reflects its still deep-rooted and pervasive poverty. Foreign initiatives backed by foreign funds and technology, especially initiatives that are job-creating, are going to be more successful in general than will potentially more important initiatives that require immediate Chinese outlays or that might reduce local employment.

V. The Future

The above comments lay out pertinent characteristics of the current Chinese system and some of their implications for cooperation on the environment. The overall thrust of the above analysis should

be sobering: China's present political system operates in a rather fluid fashion, with great local variation, considerable opportunity for local initiative, and tremendous pressure on local officials to give priority to rapid economic development. As a consequence, the country's implementation of its extensive environmental regulations is very inadequate, and its environmental offices generally are under the authority of officials whose priority is short term growth rather than long term sustainability. Putting these factors together, China's environmental conditions are likely to continue to deteriorate overall during the coming 5 - 10 years.

However, China's system is in the midst of constant change, and the longer term prognosis is less gloomy. Trends already evident in the system that are likely to become increasingly important include the following:

- Greater circulation of information based on a more relaxed view toward release of data, better communications infrastructure, and more tolerance for a diversity of views on technical issues;¹⁶
- Greater expertise, based in part on increased contacts with the international environmental community, better educational resources within China, and research dedicated to tackling environmental problems;
- Growing concern with quality of life among the increasing number of Chinese who have put poverty behind them. This is accompanied by a gradually increasing willingness by the government to consider the opinions of the population and to try to be responsive to popular sentiment;
- Greater understanding on the part of national political leaders of the real costs of environmental degradation; and,
- Gradual moves away from the "local corporationism" model and toward sharper differentiation of government from enterprises. This may result in greater official willingness

to enforce environmental standards.

Over time, the Chinese system should move in a direction more favorable to responsible environmental stewardship. Increased information and analytical capabilities, structural changes that begin to disentangle the interests of officials from those of entrepreneurs, and greater responsiveness to growing popular sentiment in favor of environmental protection should combine to increase China's desire and ability to move toward sustainable development. Foreign assistance in education, research, technology transfer, and funding can make contributions to speeding these developments along, but such contributions are likely to be more effective if they are tailored to the structure and dynamics of the Chinese political system than if they are addressed solely to resolving a specific problem.

Endnotes

¹ For a more detailed treatment of the issues raised in this section, see Kenneth Lieberthal, *Governing China: From Revolution Through Reform* (New York: W.W. Norton, 1995).

² Comments made about the government in this paper generally apply also to the Communist Party's governing structure.

³ The Communist Party's Politburo ranks higher than the government's State Council.

⁴ China's National Environmental Protection Agency has a rank below that of a ministry.

⁵ The same rule means, of course, that ministries cannot issue binding orders to other ministries, provinces cannot issue binding orders to other provinces, and so forth.

⁶ David M. Lampton and Susan Shirk provide additional explanations for this phenomenon in their chapters in Kenneth Lieberthal and David M. Lampton, eds., *Bureaucracy, Politics, and Decision Making in Post-Mao China* (Berkeley: University of California Press, 1992).

⁷ The actual nomenclature changes—from agency, to bureau, to department, to office—as one goes down the national governmental hierarchy.

⁸ Key information for these three points is drawn from Abigail Jahiel's excellent

study, *Policy Implementation Under "Socialist Reform": The Case of Water Pollution Management in the People's Republic of China* (Ann Arbor: University of Michigan Political Science Department Ph.D. Thesis, 1994).

⁹ Yasheng Huang, *Inflation and Investment Controls In China: The Political Economy of Central-Local Relations During the Reform Era* (New York: Cambridge University Press, 1996).

¹⁰ Susan Shirk argues that during the 1980s the Center's leaders followed a very specific political strategy in their granting of regulatory relief to various provincial authorities: Susan Shirk, *The Political Logic of Economic Reform in China* (Berkeley: University of California Press, 1993).

¹¹ Dorothy Solinger documents this phenomenon well for the major central China metropolis of Wuhan: Dorothy Solinger, "Despite Decentralization: Disadvantage, Dependence, and Ongoing Central Power in the Inland—The Case of Wuhan," *China Quarterly* (March 1996), 1-34. See also Paul Schroeder, "Territorial Actors as Competitors For Power: The Case of Hubei and Wuhan," in Lieberthal and Lampton, 283-307.

¹² Cf. Huang.

¹³ Kenneth Lieberthal and Michel Oksenberg, *Policy Making In China: Leaders, Structures, and Processes* (Princeton: Princeton University Press, 1988).

¹⁴ The exception to this rule is large scale projects that are funded basically from the Center. But even here, local cooperation is often vital for success. Cf. Lieberthal and Oksenberg.

¹⁵ Allen C. Choate, "Local Governance in China: An Assessment of Villagers Committees" (The Asia Foundation: Working Paper #1, February 1997).

¹⁶ See, for example, Zhu Hongfei, et al., *Fazhan yu weiji: Changjiang liuyu fazhan zhanlue sikao* (Development and Crisis: Reflections on the Development Strategy for the Yangtze River Basin) (Shanghai: Shanghai renmin chubanshe, 1996), which provides the very skeptical view of current Yangtze River Basin strategy of a research team at the State Council's Development Center.

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Environmental NGOs in China: An Overview

By Elizabeth Knup

THE EMERGENCE OF SOCIAL ORGANIZATIONS (*SHEHUI TUANTI*) IN CHINA is commanding considerable attention from observers both outside and inside China.¹ It is viewed with hope by some as the initial sign of nascent civil society and with wariness by others as a potential breeding ground for resistance to the state. Neither depiction is entirely accurate. Social organizations are emerging in China in forms not seen before, and since they are emerging in an economic, social, and political context unique to China, they possess particular "Chinese characteristics" which distinguish them from Western-style NGOs and cause confusion if viewed through a predominantly Western lens. The degree of autonomy Chinese social organizations maintain from the state is one of the characteristics which raises the most concern. There is no question that Chinese social organizations are tied more closely to the government than in many other societies, but as this article will demonstrate, this closeness, while limiting, also allows these groups to operate effectively within the current Chinese context.

The growth of social organizations in China must be viewed in terms of a China which is undergoing rapid economic, social and political change. These conditions simultaneously create the need for non-state organizations, provide the space for their development, and define the constraints within which they operate.

Economic reform has created opportunities for many Chinese citizens, but it has also exacerbated many of China's increasingly obvious social challenges, including environmental challenges. Tens of

thousands of redundant agricultural workers are leaving the countryside to find employment in the booming cities, but are not included in the urban "social safety net" which historically has provided urban workers with adequate housing, health care, pensions, and other social benefits. As China attempts to keep the economic boom going, it has become increasingly clear that state-owned enterprises (which employ an estimated 110 - 115 million workers, two-thirds of them in urban areas) must be streamlined or shut down, thereby increasing unemployment and social dislocation.² The prospect of urban centers teeming with unemployed workers without previously provided benefits sparks fears of social unrest. At the same time, rising living standards increase demands for better food and more consumer goods, putting pressure on the government to keep the economy moving forward to satisfy rising expectations. Perhaps the key question which preoccupies many Chinese leaders is how to keep the economy growing while addressing new social challenges and preventing unrest.

Another aspect of China's reform which bears directly on this discussion is the way in which revenues are collected and reallocated across society. A combination of factors, including a weak taxation system and a cumbersome state-owned sector, compounded by increasing demands on the state to address social challenges, creates a situation in which the state is unable to bear the full cost of running the society. Almost all institutions, including local governments, have been called upon to raise higher percentages of their own revenue. This relieves the state of a large financial burden, but also increases political decentraliza-

tion. Decisions about how to raise and allocate revenue are increasingly made at the local level, and local priorities tend to favor economic development. One of the primary mechanisms previously held by the state to compel adherence to central directives and policies, particularly those policies which address broad social concerns, has been significantly weakened — namely the power of the purse.³

One important outgrowth of China's reforms is a recognized need to address social concerns but a limited state capacity to do so. This situation has compelled the Chinese government to seek alternative ways to address these problems, thereby creating space for the emergence of social organizations or NGOs. As long as these organizations address problems deemed valid by the state, and in a manner deemed appropriate by the state, some public space will continue to exist and perhaps even grow. However, the situation is fluid; NGOs in China must tread warily in a vague and uncertain political climate which keeps a careful eye on potential threats to social stability and emerging challenges to the political elite.⁴

It is particularly useful to examine the development of the NGO sector through the field of environmental protection. Rapid economic development and political decentralization have exacerbated China's environmental challenges, a condition which affects all Chinese citizens more or less equally. As described elsewhere in this volume, these environmental challenges are well-recognized in both China and throughout the world. A large and growing population with rising expectations for material well-being, fed by a rapidly growing and industrializing economy, all put pressure on China's natural resources. Increased inputs in agricultural production, competition for land use, a strain on water and other essential resources, and rising air pollu-

tion problems due to heightened energy consumption and increased industrial production (particularly

should instead serve as a guide and a start on a path that needs further exploration.

Social organizations are emerging in China in forms not seen before, and since they are emerging in an economic, social, and political context unique to China, they possess particular “Chinese characteristics” which distinguish them from Western-style NGOs.

among the 10 million township and village enterprises throughout the country),⁵ all contribute to an untenable situation. However, the political structures set up to manage environmental problems are weak and the financial resources available to address the problems are limited.⁶ It is here that rapid economic development — seen as desirable and essential — conflicts directly with other social needs which are recognized as valid by the Chinese government but which it finds difficult to address efficiently on its own. It is at this nexus that the public space for emergent NGOs is being formed. At the same time, Chinese leaders, looking at the Taiwan case, see that environmental NGOs can present challenges to economic development plans and easily become politicized.

Because of the fluid nature of the changes mentioned above, assertions about NGOs in China are subject to equally rapid revision. This article draws on research (both Western and Chinese) on the nature of China’s NGOs as well as personal observation and conversations to provide a picture of a spot on a continuum. Perhaps more usefully, this article identifies some of the important NGOs in the environmental protection field and places them in the overall context of the development of civil society in China. The list is by no means exhaustive; undoubtedly new organizations emerge every day. This article

China’s NGO Sector: The Regulatory Framework

To date there are no laws governing the establishment, management, and activities of the NGO sector in China. The Ministry of Civil Affairs is reportedly working on a number of drafts, but such a law is not expected to be passed until the end of the century. Currently the only legal document pertaining to social organizations in China is the “Regulations on the Registration and Administration of Social Organizations,” promulgated in 1989.⁷ Responsibility for implementation of these regulations resides with the Ministry of Civil Affairs or its local-level departments. The Regulations pertain primarily to registration procedures and are supported by several Ministry of Civil Affairs circulars on financial management, membership fees, income generating activities, and other issues.⁸ The People’s Bank of China also plays an important role in overseeing social organizations in China through financial regulation.

As stipulated by the two-step registration procedures outlined in the Regulations, all social organizations first must obtain a state or Party sponsor (*guakao danwei*), or “mother-in-law,” which is responsible for determining whether or not the organization should be permitted to register. Upon successful registration, the sponsor is to play an important supervisory role over the social organization, and is expected

to carry out annual reviews, approve budgets and staffing plans, and act as an intermediary with the Ministry of Civil Affairs.

The second step in the registration process requires submission of various documents including a mission statement, a list of leading members of the organization, funding sources, organizational structure, and other “necessary information.” The Regulations clearly stipulate that “social organizations must abide by the Constitution, the laws and the regulations, and must protect the unity of the state and the solidarity of the nation and must not harm the interests of the state.” Social organizations must limit their activities to the geographic region covered by the Department of Civil Affairs with which they are registered and are not allowed to establish branch offices. In principle, there can be only one registered organization in a given field of work at each administrative level. The Regulations say nothing about fundraising activities other than to mandate that social organizations may not engage in profit-making business activities.⁹

This regulatory framework is at once limiting and vague. It is difficult to categorize accurately the different types of organizations which currently exist or what organizational forms might emerge. Social organizations generally include associations, societies, federations, research associations, foundations, and friendship groups which focus their activities on a range of topics including culture and arts, medicine and health, social welfare and public service, education and social sciences, and science and technology. It is currently estimated that there are over 200,000 social organizations registered nationwide, of which 1,800 are national-level organizations.¹⁰

Environmental NGOs: Degrees of Autonomy from the State¹¹

One common standard for evaluating how “genuine” NGOs

are (a standard used by both Western and Chinese observers) is the degree of autonomy any given organization maintains from the state. This can be measured in a few quantitative ways: the percentage of funding received from the government or the number of government officials on the staff or board of directors. The degree to which the activities of any given NGO are initiated without government influence is an important qualitative measure of autonomy — one which is difficult to measure given the limited transparency in China. The requirement for a government or Party sponsor certainly calls into question the ability of any NGO in China to have true autonomy. Yet, despite the required “mother-in-law,” many newly established social organizations have achieved a relatively high degree of autonomy, as long as the organization’s activities support the overall goals and policies of the state. An examination of the environmental protection field shows that, in fact, a wide range of organizations, with varying degrees of autonomy, have found space in which to operate. Moreover, the close relationship between NGOs and the government can be seen as beneficial at this stage of China’s development.

Government-Organized NGOs

The least autonomous social organizations, which are strongly favored by the current regulatory environment, are those initiated from the top down — “government-organized NGOs” or GONGOs. These tend to be associations or foundations established by state agencies or well-known Chinese leaders. Frequently the leadership of the GONGO is the same as the leadership of the sponsoring agency, and the boards of directors and membership are composed of senior officials and scholars with close ties to the government. GONGOs tend to be large, national-level organizations which receive the bulk of their funding from the

government. These are by no means grassroots organizations; their activities focus on an elite audience of scholars, policy-makers, and government officials. A subset of the GONGO is the “quasi-governmental NGO.” These organizations typically come into existence for administrative reasons to facilitate work with foreign NGOs. Chinese government agencies cannot sign cooperative agreements with or raise funds from foreign NGOs, and therefore, they frequently form “NGOs” expressly for this purpose. Some examples of GONGOs in the environmental protection field are listed below.

The China Environmental Protection Foundation (CEPF) was established in 1993 under China’s National Environmental Protection Agency (NEPA) with the donation of United Nations Environmental Prize money awarded to Qu Geping, chair of the Environmental Protection Committee of the National People’s Congress (NPC) and former administrator of NEPA. Its honorary presidents include Wan Li, former chairman of the NPC and Huang Hua, former vice premier and foreign minister. Qu Geping is CEPF’s president. Foundations in China are generally organizations which seek funding and tend to implement programs determined by the government. They rarely have endowments or programmatic autonomy. CEPF’s own literature states its first general principle is “to facilitate the donation of funds and goods in order to help develop environmental protection undertakings in China.” Other activities include the promotion of international exchange activities and honoring outstanding Chinese environmental protection professionals and journalists.

The China Society of Environmental Science (CSES) was established in 1979 with the support of NEPA and the Chinese Association of Science and Technology. The honorary

president is Qu Geping and the president is Xie Zhenhua, administrator of NEPA. The board of directors is equally as prestigious. CSES boasts a membership of 35,000 scientists, teachers, and environmental protection professionals throughout China. Its stated activities include enhancing environmental awareness and scientific knowledge, providing information to policy-making bodies, and assisting the Chinese government in mobilizing public participation in environmental protection. CSES also seeks to promote international cooperation on environmental issues and publishes academic journals and books.

The National Natural Science Foundation (NNSF) was established in 1986 under the Chinese Academy of Sciences and views itself as analogous to the National Science Foundation in the United States. It is a loose association of scholars and intellectuals in the natural sciences with approximately 250 members, 70% of whom are professors. The primary goals of NNSF are to support basic research in the natural sciences at universities, research institutes, and within industries. Some of the work supported by NNSF is directly relevant to the needs of environmental protection.

The Heilongjiang Provincial Territory Society, established in 1994 by the Heilongjiang Provincial Planning Commission is typical of the “quasi-governmental NGO.” In this case, the Heilongjiang Provincial Planning Commission committed to a four-year project with two American NGOs and two branches of the Russian Academy of Sciences to develop a sustainable land use plan for the Ussuri River watershed. In order to sign the agreement with foreign groups and to separate the funds needed to carry out its responsibilities toward the joint project, the Planning Commission created the Territory Society. On the one hand, the staff and offices of the

Territory Society are the staff and offices of the Planning Commission, indicating no autonomy from the government whatsoever. On the other hand, the Territory Society was able to involve scholars and policy-makers from the Forestry Bureau, the Environmental Protection Bureau, a variety of universities, and other administrative units in the project, perhaps more easily due to its "NGO" status. Once the joint project is complete, the parallel Territory Society may or may not continue to exist. This type of shadow organization is quite typical in China as it opens its doors further to the outside world and seeks to engage in cooperative activities with foreign, nongovernmental partners.

The clear advantage of GONGOs is their ability to draw together scholars and officials from a wide range of institutions who normally find it difficult to interact in China's highly vertical bureaucratic structure — something particularly important in the interdisciplinary field of environmental protection. As well, the prestigious leadership and membership of GONGOs draws attention to environmental issues, and provides a channel for the flow of information and ideas from the GONGO membership to policy-making bodies in the government. At this stage in China's development, new challenges require new, interdisciplinary solutions, and the potential role for GONGOs in a more well-informed policy-making process should not be dismissed.

Individual-organized NGOs

The environmental social organizations most analogous to Western-style NGOs tend to be "individual-organized" and although they also are regulated by the Ministry of Civil Affairs, they are far more autonomous than GONGOs. Typically, these groups are organized around a committed individual who — in most cases — establishes the organization, often

with difficulty, and who struggles to keep the organization running with few staff and extremely limited financial resources (often personal savings). The founders/leaders of these organizations usually have some connection to the government, although it is informal — usually through personal connections (*guanxi*) and therefore the political protection provided is less secure than for GONGOs. These organizations tend to be more grassroots in nature, draw their members and volunteers from among the general population, and focus their educational and awareness-building activities "down" as opposed to "up." Funding for these groups is mixed, including small grants from Western foundations or multilateral organizations, personal savings of the leaders and tiny contributions from members, and a "pay as you go" approach to their activities. The founders of this type of organization frequently have ties to the West where they have observed that independent organizations and individuals can make a difference in terms of education about environmental issues. For the most part, however, these "individual-organized" NGOs focus on activities which support the stated environmental protection goals of the state. Some examples of "individual-organized" NGOs in the environmental protection field are listed below.

Friend of Nature (FON) was established in 1994 by the historian Liang Congjie. Liang initially approached NEPA seeking sponsorship for his NGO. When he was turned down, after a ten-month wait, he went to the Academy of Chinese Culture (where Liang is both a professor and vice president) for permission to establish a "green culture" group. Permission was granted, and FON was established as a national-level membership organization. FON's membership includes over 250 individuals, mostly intellectuals, but the activities of the organization focus primarily on raising environ-

mental awareness among China's general population.

FON's activities were initially small, with groups of like-minded intellectuals gathering in secluded parks to commemorate Earth Day or to discuss environmental issues. They soon began to focus on environmental education, particularly at the primary and secondary school level, and sponsored environmental art exhibits in schools and other activities designed to raise the environmental awareness of young people. FON's activities have grown in scope and now focus in two primary areas: environmental education and habitat/wildlife conservation. FON has recently developed and published a primer of environmental readings for school children, organized field trips, and established a "Forest and Kids" summer camp.

FON's wildlife/habitat conservation efforts focus primarily on the Golden Monkey in Yunnan Province where the logging practices of the local people threaten the monkeys' habitat. Importantly, this activity has broadened FON's activities into the realm of advocacy, albeit advocacy with "Chinese characteristics." When the threat to the monkeys' habitat was brought to the attention of FON, the group mobilized its members to write letters and send petitions to central government officials; with additional support of the media, FON has exacted a promise from local officials to reconsider the logging decisions. The significance of this activity lies not in the promise to reconsider the logging decisions,¹² but in the form of advocacy Liang and FON created. They identified a problem which the central government itself recognized but which it was ill-equipped or unwilling to address. They mobilized citizens and the media in support of stated government goals for sustainable development practices, and compelled the government to enforce its own policies.

Global-village Environmental Culture Institute of Beijing (GECIB) was established in 1996 by Liao Xiaoyi. Primarily using personal savings supplemented by small grants from Western and multilateral organizations, Liao and her one staff member focus GECIB's activities in two main areas: the production of a series of television programs, including a weekly television program entitled, "Time for Environment," and efforts to popularize reuse and recycling among the households of Beijing. Liao also writes articles on environmental issues for such publications as *China Women's Daily* and *China Youth Magazine*, although it is unclear if these activities are considered part of GECIB or personal contributions to the popularization of environmental issues in general.

Beijing Environment and Development Institute (BEDI) was established in 1995 by Ma Zhong with the support of the People's University's Institute of Environmental Economics, where Ma is a professor. BEDI focuses on applied research on environmental issues and seeks to encourage the use of new approaches to development planning and environmental decision-making among China's environmental protection and development agencies. In one case, research by Ma and colleagues at the Institute of Environmental Economics was instrumental in the reevaluation of development plans in Heilongjiang's Three Rivers Plain region where wetland preservation and agricultural development come into direct conflict. As with FON, such reevaluation may not result in a substantial change in local behavior. The significance lies in the increased ability of relatively independent organizations to insert ideas into the policy development and implementation process.

Center for Biodiversity and Indigenous Knowledge (CBIK) was established in 1995 and is affiliated with the Kunming Institute of Botany under the Chinese Academy of Sciences.

CBIK's activities combine research on conservation and development, work with rural communities to sustainably manage their natural resources, and communication among government officials, scholars, and rural farmers about environment and development. The executive director of CBIK, Xu Jianchu, administers a wide range of projects, including programs to

The clear advantage of GONGOs is their ability to draw together scholars and officials from a wide range of institutions who normally find it difficult to interact in China's highly vertical bureaucratic structure.

rehabilitate degraded ecosystems in upland Yunnan Province and to encourage community participation in biodiversity and conservation efforts. CBIK supports a library accessible to researchers from different institutions, training programs, and workshops. The Center also provides consulting services to the government and to international organizations in the design of environmental projects in southwest China.

Institute of Environment and Development (IED) was established in 1994 with the sponsorship of the Beijing Science and Technology Association by graduates from the Rockefeller Foundation's Leadership for Environment and Development training program. (Ma Zhong, founder of BEDI, is also a graduate of this program.) The director of IED, Li Lailai, plans to develop a database of case studies of sustainable development and research on environmental issues which ideally will be accessible to a range of environmental protection professionals and scholars across China via the Internet. While

pursuing this long-term goal, IED currently provides Internet connections and training.

Voluntary Organizations

The groups described above reflect a range of organizational forms, including membership organizations, applied research institutes and centers, and more narrowly focused "single-issue" organizations. There is, however, one other organizational form emerging which is perhaps the most autonomous of all the voluntary organizations. The author has details of only one of these types of groups, but assumes that there are more and that the number is growing. One reason these groups are difficult to track is that they are not registered with the Ministry of Civil Affairs, and as voluntary groups they do not have formal organizational structures or staff. Rather, individuals with like interests come together voluntarily on an irregular basis to work together towards a common goal. The same individuals may or may not come together in the future, and there is nothing that binds them together institutionally.

Green Earth Volunteers (GEV) co-founded in 1997 by Wang Yongchen, a popular radio personality and board member of FON, is a known example of a volunteer organization. Wang and her co-founder organize activities which are carried out by volunteers who generally pay their own way in order to participate. For example, earlier this year, GEV organized a group of volunteers to travel to the Inner Mongolia Autonomous Region to spend three days planting trees in the Engebie Desert. The 108 volunteers each paid \$78 to cover transportation and other costs associated with the project. Other anticipated activities include training volunteer guides for Beijing's zoo and botanic gardens, and encouraging individuals to volunteer their time in classrooms to share knowledge about the environment.

Conclusion

If held up to the lens of commonly held Western definitions of NGOs, China's social organizations appear flawed, particularly in terms of their relative autonomy from the state. However, viewed in terms of what is currently needed at this stage of China's social development, and seen as growing out of a particular economic, social, and political context, those flaws can be seen as assets, or at the very least as evidence of growing pains.

The need for a sponsor is one of the most important "Chinese characteristics" which defines Chinese NGOs. The sponsor has veto power over the establishment of the nascent NGO which often makes it difficult for NGOs without good political connections to pass the first registration hurdle. This is evidenced by Liang Congjie's initial trials. The result is generally a very close relationship — either formal as in GONGOs or informal as in "individual-organized NGOs" or voluntary organizations — between an NGO and the government. From a Western standpoint this calls into question the autonomy of the social organization, and by extension its genuineness and credibility. However, there are varying (and increasing) degrees of autonomy. Moreover, in the Chinese context where the state has come to depend on social organizations to carry out certain activities, the close relationship creates a bridge between non-state, even grassroots, organizations and the official state agencies over which information, policy ideas, and advocacy can travel. It also allows the NGO to know the priorities of the state, helping it navigate shifting political tides. Of course, the system works because the organizations do not oppose the policies of the state. Most of the NGO leaders recognize this and have determined that it is not worth behaving antagonistically since there are enough state-endorsed projects they can undertake that are beneficial to China's environment.

Challenges lie ahead for China's fledgling environmental NGOs — particularly "individual-organized" NGOs and voluntary organizations. As the organizational momentum comes from the personal authority of the founder/leader, the transition to more sustainable governance and organizational structure is difficult. It is also quite difficult to adequately staff fledgling NGOs since employment is expected to carry with it social benefits such as housing, health care, and pensions, something impossible for these organizations. Funding is a constant difficulty, particularly in the current climate. And, without a clearer legal framework, the political existence of these groups is always in question.

Perhaps the most important achievement of these organizations is that they are changing, in incremental ways, the manner in which average citizens interact with each other and with the state. Individual volunteers and members, loosely affiliated with "individual-organized" NGOs and voluntary organizations, comprise the most autonomous sphere of China's growing environmental movement. Teachers, journalists, scholars, housewives, children, retirees — in short, a diverse range of average citizens — are finding both a space in which to come together and a means by which they can articulate shared concerns.

Endnotes

¹ Social organizations (*shehui tuanti*) are those organizations in China most analogous to Western-style NGOs. For the purposes of this paper the terms will be used interchangeably.

² China's president, Jiang Zemin, opened the 15th Party Congress with a speech in which he stated, "We should encourage mergers of enterprises, standardize bankruptcy procedures, divert laid-off workers, increase efficiency by downsizing staff and encourage re-employment projects." Seth Faison, "China's Leader Announces Sell-off of State Enterprises," *New York Times*, 13 September 1997, 7.

³ For a review of various perspectives on

the effects of China's economic reform, see *The China Quarterly's* special issue on China's Transitional Economy, No. 144 (December 1995).

⁴ For a detailed discussion of the effect of economic and social change on China's emerging NGO sector, see National Committee on U.S.-China Relations, *The Rise of Nongovernmental Organizations in China: Implications for Americans* (National Committee on U.S.-China Relations: New York, 1994), 1-5.

⁵ Abigail R. Jahiel, "The Contradictory Impact of Reform on Environmental Protection in China," *The China Quarterly* 149 (March 1997): 93.

⁶ Local-level Environmental Protection Bureaus (EPBs) are in a difficult position. They are tasked with carrying out environmental protection activities which are often seen as financially onerous by local enterprises. And, the EPBs are subject to local governments which are often more interested in increasing profits in the local economy than in preventing or cleaning up pollution. For a discussion of the structural and financial difficulties faced by local-level EPBs, see Jahiel, 81-103; or, see Lieberthal in this journal.

⁷ This document supersedes the Provisional Measures on the Registration of Social Organizations promulgated in 1950. For a more detailed history of the development of social organizations in China, see Zhang Ye, "Chinese NGOs: A Survey Report," in *Emerging Civil Society in the Asia Pacific Community* (Institute of Southeast Asian Studies, JCIE and The Asia Pacific Philanthropy Consortium, 1995), 94-98.

⁸ National Committee on U.S.-China Relations, 12.

⁹ "Regulations Concerning Registration and Administration of Social Organizations," Decree No. 43 of the State Council of the People's Republic of China (October 1989).

¹⁰ Groups not included in these categories are political parties; the "eight big bodies" (*ba da tuanti*), i.e., women's federations, trade unions, communist youth leagues, etc.; groups established by foreign citizens or Chinese citizens residing abroad; and religious organizations. See, Michaela Raab, "Social Development NGOs in China," Executive Summary of a report commissioned by the Ford Foundation, 1996, 3.

¹¹ The information in this section is drawn from literature and brochures published by the organizations described and from personal conversations held with staff members of the

organizations unless otherwise indicated.

¹² Liang, himself, recognizes that a simple promise will not curtail the logging. Local communities rely on logging for their economic development goals, and a more sustainable relationship between the local people and their environment must be found. This, he admits, will take much more than a letter-writing campaign. For a detailed description of this activity see, Seth Dunn, "Taking a Green Leap Forward," in *The Amicus Journal* (Winter 1997), 12-14.

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Energy and Security in East Asia

by Michael May

THERE ARE OPTIMISTIC AND PESSIMISTIC VIEWS OF CHINA, BUT EVEN among the optimists there is an underlying concern. The problem with China is not human rights abuses (which are no greater than in many other countries) nor arms sales (where its \$800 million in sales is less than a quarter of Russia's and less than 7% of U.S. sales — and less than a third of U.S. arms exports to Taiwan alone¹) nor yet its trade surplus with the United States, or its attempts to obtain advanced U.S. technologies, all of which are features of U.S. relations with many other countries.

The problem with China is that it is big. Big and becoming more powerful. Not just China; the same can be said of East Asia. A huge amount of power is shifting from "the West" to Asia. Because of that change, the usual ways the West has dealt with East Asia — trade and evangelism backed by muscle — are obsolete. No one knows what will take their place or at what cost, human and economic, or, for that matter, with what attendant benefits.

The concern takes several forms and dimensions. One dimension is energy. Oil: where is Asia's oil coming from? Nuclear: East Asia has only about seventy of the world's four hundred-plus nuclear power reactors, but it is the only part of the world where nuclear power is growing and expected to continue growing. Global warming: China puts half as much carbon into the atmosphere as we do, but its contribution is growing faster than ours. What can be said about all this?

Future watchers sometimes look at no-surprise scenarios. A no-surprise scenario is what happens

if current trends continue, as affected by foreseen changes: changes in demand caused by satiation or new products, for instance, or foreseen changes in supply. Fluctuations are part of the scenario, but catastrophes are not included: thus, local wars and depressions will come and go in the world, but the world-wide depression and major-power war which have not come in the last sixty years will not come, it is assumed, in the next fifty.

These assumptions could prove wrong. A no-surprise scenario is not a prediction. Its value lies in assembling what most individuals and institutions are forecasting. Combining these forecasts allows us to determine whether future outcomes will be desirable.

What does a no-surprise scenario tell us about energy and pollution, in China, in East Asia, and in the world? Decades are the right time span to examine energy matters: it takes forty years to amortize a modern power plant, thirty to fifty to get a new technology into the power grid, longer than that to stabilize global warming. What will the United States, China and the rest of the world look like in forty or fifty years — assuming we get that far without catastrophes — so far as energy and pollution are concerned?

Fifty years from now, under a no-surprise scenario, the world's population will be twice what it is today. Economic growth between now and then, and all the other factors which affect people's lives, will be determined by a host of important causes — leadership, political stability, the behavior of the rich minority of people in the world, climate, and others — which are assumed in a no-surprise scenario not to change very much. Under that

scenario, most of the new people in the world will be poor. Unfortunately, most of the surprises we can foresee (war, depression) would make them even poorer.

Nevertheless, these people will use about two and a half to three times as much energy as they do now, most of it in now developing countries. A factor three increase in energy consumption of itself is not unprecedented: it is approximately the factor by which world energy consumption has risen in the past fifty years. The actual numbers — of millions of tons of coal and billions of barrels of oil burned, of carbon released into the atmosphere, and of nuclear spent fuel (and plutonium) produced — on the other hand are far higher. Still, we will not run out of fuels. Some real resource costs are likely to increase: coal because of a probable increased tightening in environmental controls, oil and uranium because of a likely gradual rise in extraction cost. But as they are now foreseen, the increases will not be sufficient to interrupt economic growth, at least not in East Asia, with its large rate of savings and investments and its relatively effective economic management.

China under that scenario will have a lower fraction of the world's people than it does now, but a higher fraction of its economic product and of its energy consumption. That consumption, estimated conservatively, with a declining but still healthy economic growth rate and continued energy conservation measures, will increase twice as fast as that of the world as a whole, to a fifth or a sixth of total world consumption, on a par with the U.S. consumption at that time. These growth rates will certainly not be uniform over the period considered. They will fluctuate, but at a relatively high average. For comparison, over the past fifty years, the economy of East Asia as a whole, led by Japan, has grown an average of 4% per year.

Coal will continue to provide

over half of China's energy — China is now the largest coal user in the world — although, if current plans work out, much of this new capacity will be in cleaner burning plants. The Three-Gorges hydroelectric plants will long have been on-line, but hydroelectric power will be hard-pressed to maintain its present 25% share of electrical capacity: China should then have about a thousand gigawatts of installed electric capacity, roughly five times what it has now and two and a half times what the United States has now. Nuclear power could be the largest gainer percentage-wise. Again, if current plans work out, it could provide over 30% of Chinese electricity, comparable to the fraction it provides now for the rest of East Asia. With China's huge prospective electric generating capacity, however, this would constitute over a hundred-fold expansion, and it would mean as much nuclear power in China then as there is now in the world.

All told, China will be on a rough par with the United States in energy use, global pollution and gross domestic product (it is now at a half, a half and a tenth to a fourth of U.S. levels respectively²), but not in per-capita income. The Chinese will still on average be poorer than Westerners, though much wealthier than they are now. Behind China, and behind the rest of East Asia, will be several billion more people who will, one can only hope given the alternatives, be on their way to modernity, including modern energy consumption. Their prospects will depend in good part, as they do now, on the political and economic policies of the richer states.

What's wrong with this scenario? What contradictions does it contain? What unrealistic assumptions does it make? Four points come to mind:

1. Continued Open World Markets

The no-surprise scenario implies continued open world markets. Otherwise, neither China nor

the rest of East Asia will have the wherewithal to buy the needed oil and gas, much of which will still come from the Middle East, the Caspian Sea area and the rest of Russia. China produces about 80%

fluence of the United States, the economic growth of China has an ambiguous impact: it inevitably increases both Chinese national power (including the potential for military investments) and, because

From the standpoint of the relative power and influence of the United States, the economic growth of China has an ambiguous impact: it inevitably increases both Chinese national power and, because it requires participation in international trade, Chinese economic interdependence.

of its oil now, but that percentage is likely to decline, even under optimistic assumptions about the size and availability of the oil resource in Western China. The natural gas outlook within China and offshore is still uncertain, although most estimates lead to an indigenous resource perhaps comparable to that of the United States.³ Large Chinese contracts for oil and gas and for the needed pipelines are being let with Russia and Kazakhstan, albeit the source of their financing has not been made clear. The rest of East Asia is even more highly dependent on world markets for oil and gas, as well as uranium and coal for Japan and Korea. It is important to note that world markets must remain open both to East Asian exports and to fuel imports for economic and energy consumption growth to take place at the rate suggested here.

Continued open world markets are not a contradiction with anything in the rest of the scenario, but their existence implies continued political foresight and wisdom in dealing with the likely ups and downs of international relations, in particular the relations between a growing superpower, China, and an established superpower, the United States.

Will China's economic growth be seen in the United States as serving U.S. interests? From the standpoint of the relative power and in-

fluence of the United States, the economic growth of China has an ambiguous impact: it inevitably increases both Chinese national power and, because it requires participation in international trade, Chinese economic interdependence. For China, as for any country, the development of national prosperity and power requires international economic interdependence. The latter, in turn, serves to further increase domestic development and national power.

Three arguments support the thesis that the United States should support Chinese growth, not only for the welfare of China, but for its own:

- First, by supporting Chinese participation in world markets, the United States is supporting the considerable political forces in China which desire to and would profit from continued economic openings and reforms.⁴ By opposing this participation, or making it contingent on transformations in the Chinese polity and society which are unlikely to be possible in the short run, the United States is strengthening the hand of the political forces that could pose a danger to peace and to the United States.

- Second, a stable world with an open world economy which includes China is what China's neighbors, including U.S. allies, want. The major East Asian and Southeast Asian states (other than China) want the United States as a balancer, in military, economic and political dimensions, but none wants a conflict and none wants to have to

choose between the United States and China.

• Third, and as a result of number two, economic containment policy is not possible for China, as it was for the Soviet Union. China, since the start of the Deng era, has conducted the opposite of the autarchic economic policy which the Soviet Union conducted. As a result, Japan, the Koreans, Taiwan, and the ASEAN states all have a stake in an economic order of which China is an essential part. Russia, for both strategic and economic reasons, has also been improving its ties with China, a trend which it is in both countries' interest to continue. Thus, the preconditions for successful economic containment are absent.

If these arguments prevail, world markets will remain open to East Asian states in general and to China in particular. If they do not, there is little question but that denial of trade with the United States could cause a serious economic setback in China. As Chinese aggregate internal demand expands, the effect of trade with the United States will diminish. The long-term outcome is unclear. U.S. restrictions on trade with China could as easily isolate the United States from the rest of Asia (and Europe, a major Chinese trade partner) as they could succeed in isolating China. This has been exemplified by current U.S. nuclear reactor export policy, where all nuclear reactor exporters but the United States engage in a lively trade with China.

2. No Reduction or Stabilization of Carbon Emissions

The no-surprise scenario does nothing to reduce or stabilize carbon emissions. This is a global, not an Asian problem, one which may, fifty years from now, loom larger than any other. The United States and Europe will continue to be the largest emitters. Without large investments in research and development and even larger ones in new industrial plants and means of

transportation to replace our present fossil fuel-based plants and transportation, the global carbon emission rate will increase two- to three-fold over the present rate. There could be one to a few degrees of global warming well before mid-century, with further increases on the way. We do not know now, and will not know soon, what the economic, societal and political consequences of that amount of warming would be. Thus, as it stands, the no-surprise scenario does not make provision against a possible highly disruptive, perhaps catastrophic contingency.

If action is needed on this score, the terms of the necessary global cooperation promise to be a highly charged political matter, since different countries come to the table with very different interests. Since the scientific basis and regional climatic and economic implications of global warming are very uncertain, and will remain so for some time to come, the situation is even more difficult. Indeed, it is quite possible that global warming will not lend itself to an orderly approach wherein the scientific situation is understood before action is planned and carried out, but rather that signs which indicate that action is needed (such as prolonged regional falloff in food production and increased frequency of severe weather) will appear before the situation is fully understood scientifically. This possibility increases the value of carrying out needed developments of economically acceptable non-fossil sources of energy as a risk-reduction measure, before the cost of these developments is justified by the market at business-as-usual rates of discount.

3. Reliance on Expensive Oil Imports

The scenario uses more expensive oil, possibly by \$10 a barrel of crude oil on average. That in itself would not halt oil imports, though it will be a burden especially on developing economies. On the way to

higher average price, however, there could well be — without adequate investments, there almost surely will be — temporary shortages and price spikes. As an economic matter, these can be dealt with at some cost without breaking down the world's trade and financial order, as the developed world's reaction to the oil crises of the 1970s showed. As a political matter, viewed again through the prism of a worried establishment superpower, or a resentful new one, these shortages could lead to defensive reactions such as exclusive arrangements for supplies, backed by force, which would worsen both the economic and the political situation for all without much benefit to anyone in either area.

4. Maintenance of Current Security Structures

Most importantly, the scenario assumes that the world's major powers continue to support a structure of security under which rivalries and disagreements (which will not go away) can be pursued without striking at the vital interests of any one, and, of increasing importance, within which global problems such as climate change, handling of nuclear power and materials, and maintenance of world markets, can be addressed effectively. So long as this structure holds, solutions are possible for the problems above, though some solutions will no doubt come only after considerable climatic and economic damage has been done. Without this framework of security, no solution to these global problems can be envisaged. Rather the world's major powers, and many others as well, will split, with or without war, and be left to pursue what are bound to be ineffective national or regional solutions.

Economically, a number of major powers need to cooperate. Strategically and militarily, the major powers which must have an understanding that permits a peaceful evolution are the United States,

China and Russia. In particular, it is difficult to envisage anything but the most primitive of holding actions taking place on global warming, oil prices, and continued open world markets without the cooperation on these matters of the two nations which are slated to have the world's largest economies, and be the greatest energy consumers and carbon emitters, the United States and China. Whether they welcome it or not, their cooperation is the most important prerequisite for the no-surprise, or at least no-too-unpleasant-surprise, scenario.

We note that this cooperation will have to take place against a complicated historical background. From the start of its interactions with East Asia two hundred years ago, the United States, following the lead of other Western states, has prominently involved its military power in support of its East Asian objectives. U.S. military forces remain in the region, and are indeed today dominant in certain dimensions of force, such as naval and air forces, combined arms operations, and intelligence. The United States will presumably maintain its traditional U.S. goals of avoiding Asian dominance by another power and improving terms of trade. Will the pursuit of these goals, particularly the first one, be compatible with cooperation on other matters, especially with maintaining open markets, which by their nature will strengthen the economies of potential rivals?

China is not the last billion-strong group of people who will want to participate in the world's economic and energy growth up to near first-world standards or as close to them as they can come. How the existing powers, most of all the United States, engage China is likely to have a profound effect on the perceptions which India, Pakistan, Indonesia, and many other countries in and outside the Asian continent will have of the options open to them and on the assumptions they will make about what the

U.S. role in their growth will be. Conversely, any understanding the United States, China and Japan reach about the factors of growth and energy in particular will affect not only the region, but the world.

As a consequence, a strategic understanding between the United States and the states of East Asia, and China especially, must address the question of how these states can cooperate to lay the groundwork for a peaceful evolution of the rest of the developing world. Otherwise, the understanding will leave out matters that are likely to affect it. All of the items suggested above, energy supplies, environmental impact of energy consumption growth, nuclear issues, long-term investments, will, by mid-century, have to be confronted in the new context.

The U.S. policy establishment itself, and those in other developed major powers, will come to terms with this new global context as a matter of national survival. The process has begun but the outcome remains very much in the balance. At present, major powers including the United States oscillate in their domestic politics and their policy approaches between narrow, predominantly defensive definitions of national interests, leading to a restrictive approach to growth in underdeveloped countries, and a definition of national interests which emphasizes mutually beneficial outcomes. The former is a dead end leading to conflicts no one can win, the latter offers a difficult road to technically and economically reasonable outcomes.

Endnotes

¹ Figures from *World Military Expenditures and Arms Transfers 1995*, U.S. Arms Control and Disarmament Agency, April 1996. The study has been carried out at the Center for International Security and Arms Control (CISAC), in the Institute for International Studies (IIS) at Stanford University, as part of the project on "American Alliances with Japan and Korea in a Changing North East Asia." Professors Dan Okimoto

and Michel Oksenberg of the Institute's Asia-Pacific Research Center (APRC) are the project leaders. The project is supported by a grant from the Smith-Richardson Foundation and the Japan Foundation Center for Global Partnership. The author thanks Ekaterina Drozdova and L. Celeste Johnson of CISAC for their research help.

² China's gross domestic product is about a tenth that of the United States if measured at currency exchange rates, roughly a fourth if measured at purchasing power parity (what the money actually buys for consumers). The right ratio so far as energy investments are concerned is probably somewhere in between.

³ From Jonathan Sinton, ed., *China Energy Databook*, p. I-5, published by the Lawrence Berkeley National Laboratory for the Department of Energy, (1996)

⁴ See Dale C. Copeland, "Economic Interdependence and War: A Theory of Trade Expectations," *International Security*, Vol. 20, No. 4 (Spring 1996), pp. 5-41 for an analysis of the dynamics of expectations from international trade in recent cases. With its large ratio of external trade to GDP and its nationalistic rather than universalistic ideology, China is somewhat closer to pre-World War I Germany and pre-World War II Japan than to the Soviet Union. Its leadership is not dominated by war parties, however, and is at present optimistic on balance rather than pessimistic about how world trade will affect it.

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The Role of Nuclear Energy in the CO₂ Mitigation Strategy of the People's Republic of China

By Yingzhong Lu

AS THE MOST POPULOUS COUNTRY IN THE WORLD, THE PEOPLE'S REPUBLIC OF CHINA (PRC) has successfully recovered from its past disastrous economic policies and adopted a novel, "Chinese-Style Socialistic" economic policy. Under this new policy, the economy has achieved unprecedented rapid growth. To the surprise of many domestic and foreign economists, the Chinese GDP has quadrupled within 15 years, almost 5 years ahead of the PRC's original plan. The high inflation rate associated with abrupt economic growth is now under control and the high growth rate of the Chinese economy is expected to continue for decades.

The fast-growing economy of the PRC was successfully fueled by a powerful energy policy. (Lu, 1993 and 1997) Domestic resources have fueled China's huge energy demand: China did not amass foreign debt in the early stages of its energy

This article is the first of two which discusses the environmental implications of nuclear power development in China. A piece in Issue 2 of the Series will describe the negative impacts of nuclear power expansion.

crisis. In the meantime, the PRC has established a sustainable energy conservation and supply system which will support its fast economic growth into the next century. Despite the suspicion of many energy-economists, the ambitious Chinese goal (declared in 1979) of quadrupling GDP while only doubling energy consumption by the year 2000 has been exceeded. This implies that Chinese energy intensity was cut by 50% during the past 15 years; a comprehensive energy conservation policy was successfully implemented.

Various studies — notably those performed by the Institute of Nuclear Energy Technology (INET) and the Institute for Techno-Economics and Energy System Analysis (ITEESA) of Tsinghua University under the sponsorship of the State Planning Commission (SPC) and the State Science and Technology Commission (SSTC) — have forecasted the future of the Chinese economy and Chinese energy supply and demand. Their results are summarized in Table 1.

These forecasts reflect a comprehensive approach. The critical factors considered include: 1) the

effectiveness of population control policy; 2) the change of economic structure; 3) the potential of energy conservation; and, 4) the availability of capital investments. From 1990 to 2030, the GDP is predicted to increase approximately 17 fold, while energy demand is predicted to increase by only 4.47 fold, corresponding to an energy intensity reduction of 26% of its 1990 value. From demonstrated past performance, these goals are believed to be realistic and attainable.

Based on the above forecasts, however, energy-related CO₂ emissions will still increase 4.48 fold from 1990 to 2030. Total annual emissions will correspondingly increase from 2.13 Gt to 7.62 Gt, still 27% higher than the current U.S. level. The per capita emissions in the PRC in 2030, however, will only be one quarter of the U.S. value, i.e., 5.49 tones against 23 tones per person. Given the 2030 per capita GDP in the PRC (only 15% of the present U.S. level), growth of the Chinese economy will continue and as a consequence CO₂ emissions in the PRC will continue to increase unless effective measures are undertaken by the PRC and the world.

I. Is There a Real CO₂ Mitigation Opportunity in the PRC?

Great efforts have been made on CO₂ mitigation technologies all over the world. For example, the Global Environmental Facility

Table 1: Economic Growth and Energy Demand Forecasts in the PRC

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(GEF), jointly sponsored by the World Bank, the United Nations Development Programme, and the United Nations Environment Programme, has established a number of pilot projects to address CO₂ mitigation in various developing countries, including the PRC. These projects include energy conservation, renewable energy, infrastructural development, and the development of local resources.

The outcome of these projects will unquestionably benefit CO₂ mitigation in the PRC. However, given the multi-Gt scale of required mitigation efforts in the PRC, a more comprehensive mitigation strategy must be formulated. Under the joint sponsorship of several international agencies and governments, a Country Climate Change Study has recently been performed in the PRC, the outcome of which has been documented in a draft Final Report submitted to the Asian Development Bank. (Country Climate Change Study Team, 1997) In this study, the priorities for all potential

greenhouse gas (GHG) mitigation measures were established with an Analytic Hierarchy Process (AHP). The set of assessment criteria included: 1) mitigation potentials; 2) local environmental impacts; 3) energy and resource efficiency; 4) economic costs; 5) consistency with national development goals; 6) availability of resources; and, 7) localized manufacturing and infrastructural needs. The areas assessed include energy efficiency improvements, conventional energy supply technology, and new and renewable energy development. The mitigation strategy thus formulated contains the following elements:

- Enhancing energy efficiency improvements;
- Accelerating utilization of new and renewable energy; and,
- Encouraging the energy substitution of coal with hydro power and nuclear power.

The resulting energy mix is listed in Table 2. A summary of the poten-

tial of CO₂ mitigation with all these measures (Policy scenario), in comparison with the Business as Usual (BAU) forecast values, is provided in Table 3.

As shown in the policy scenario of Table 2, the combined share of two CO₂-intensive fossil fuels, coal and oil, is reduced by 14.98% in 2030, while the share of a less CO₂-intensive fossil fuel, natural gas, is increased by 1.5%. The combined share of three non-CO₂ emission fuels, hydro, nuclear and renewables, is increased by 13.48%. Nuclear power will be the most important contributor to CO₂ mitigation in this scenario.

In Table 3, the CO₂ emissions in 2030 under the policy scenario will be reduced by 29% of the BAU scenario value, or about 2.2 Gt annually. This corresponds to more than one third of total current U.S. annual emissions. This is an unprecedented challenge to any country devoted to CO₂ mitigation.

Table 2: The Primary Energy Mix Scenarios

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[illegible]

Given the magnitude of the CO₂ mitigation problem, only those

Gt: gigatons (one billion tons)
Mt: megatons (a million tons)
Mtce: megatons of coal equivalent
kgce: kilogram of coal equivalent
Gtc: gigatons of coal
Mtc: megatons of coal
RMB: Renmibi, the name of the Chinese currency
Sv: International radiation dose unit
GWa: gigawatt year (annual)
TWe: Tetrawatt electricity
TWe.h: Tetrawatt electricity / hour
FBR: Fast Breeder Reactor

Nuclear power is a mature, well proven energy source throughout the world. Currently, 433 nuclear power units operate worldwide, with a total capacity of 345.5 gigawatts. The United States still leads in operating nuclear power capability, with 109 units and 100.5 gigawatts, but the construction of new stations has been halted for many years. Both France and Japan rely heavily on nuclear power: nuclear units supply 77% and 34% of their total national electricity consumption, respectively. Table 4 displays the nuclear shares of power generation of various countries in 1996. In spite of some controversies over political and environmental issues,

The first operating nuclear power station in the PRC was the 300 MWe Qingshan I nuclear power plant (NPP). This Chinese designed and constructed power plant is based on the technologies developed for the Chinese nuclear navy. The Qingshan I NPP was connected to a grid on 15 December 1991, and its annual load factor increased from 68% in the first year of commercial operation (1994) to 84% in the fol-

Table 4. Nuclear Power Share, 31 December, 1996 (Hu, 1997)

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lowing two years.

The second nuclear power station in operation is the Daya Bay NPP, a twin-900 MWe unit imported from France and jointly owned by Chinese and Hong Kong companies. Currently, four other NPPs are under construction, design, or active planning in China. These include two twin-600 MWe domestic designed Qingshan II NPPs, a twin-700 MWe Qingshan III NPP imported from Canada, a twin-900 MWe Lingao NPP to be imported from France, and a twin-1,000 MWe Lianyungang NPP imported from Russia. In addition, a number of 20-23 GWe nuclear power plants are scheduled to be completed before 2010. (Shen, 1997) The localization of heavy nuclear components manufacturing is also an important element of the Chinese nuclear program. Based on the experience of the Republic of Korea (ROK), the PRC will be able to localize the majority of the key nuclear components within the next two decades.

2.4 Nuclear Power Will Be the Least Cost-Option for Gt-Scale CO₂ Mitigation

Although China has abundant coal resources, serious transportation bottlenecks and local pollution have forced Chinese decision-makers

to pursue a progressive nuclear power program. The implementation of such a program is restricted mainly by the availability of capital. This situation will change when the local supply of heavy nuclear components increases. In 1996, INET, under the sponsorship of IAEA, conducted a detailed techno-economic assessment of nuclear and coal power in China. (Luo et al., 1996) The outcome of this study just-

tified the techno-economic feasibility of nuclear power development in coastal areas of the PRC. Table 5 summarizes the specific investment comparison of imported NPP with coal-fired and hydropower stations for a 9 GWe Power Program in Guangdong province.

When a fuel supply system is included, the cost of imported nuclear power stations is only slightly higher than that of coal-

Table 5. Investment of a 9 GWe Power Program in Guangdong
Using Different Power Units
(In US\$M, Load Factor=75%, Discount Rate=10%)

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fired power stations without flue gas desulfurization (FGD), but lower than the hydropower technologies. The findings of the INET report are supported by the analyses of the Country Climate Change Study, which compared the incremental costs of CO₂ mitigation for nuclear power, advanced coal use, wind power, and hydro power. The results of this analysis are summarized in Figures 1 and 2. (Country Climate Change Study Team, 1997)

In Figure 1, imported nuclear power stands as the third highest in incremental cost of CO₂ mitigation. This implies that imported nuclear power is not the most economic option. On the other hand, Figure 2 shows that domestically manufactured nuclear power equipment is the optimal economic choice.

2.5 Nuclear Power Reduces Local Pollution Among Megawatt Power Systems

Nuclear power is considered a clean energy source by most Chinese, even by many environmentalists. This perspective results from the serious level of local pollution caused by extensive coal burning in the PRC. The most well-known air pollutants from coal are particulates, SO₂, and NO_x from flue gas. However, the emissions of radioactive material from coal burning are also more serious than those produced by nuclear power stations. A comparison of estimated collective doses and the associated health risks caused by coal-fired and nuclear plants are summarized in Table 6. (Luo et al., 1996)

As shown in Table 6, annual fatalities resulting from ionized radiation are higher in the case of coal power. If all other pollutants and accidents are also considered, the fatality rate in a coal power system is substantially higher than in a nuclear power system, as shown in Table 7. (Luo et al., 1996) Even with future technical improvements, the fatality risk of coal-fired systems will be three times as high as those of nuclear systems.

Figure 1. Incremental Costs of CO₂ Mitigation with Imported Nuclear Equipment

Figure 2. Incremental Costs of CO₂ Mitigation with Domestically Supplied Equipment

III. Barriers to the Large-Scale Nuclear Power Program in PRC

tive-waste management; 3) domestic anti-nuclear movement; and, 4) international concern over non-proliferation.

Nuclear power is a capital-intensive enterprise. As shown in Table 5, the unit investment of an imported nuclear power plant is 50% higher than an imported coal-fired plant. Currently, China cannot manufacture some heavy nuclear components, thus import equipment is indispensable. Foreign investment for NPPs is available, particularly in connection with nuclear equipment exports. However, due to payback capability considerations, China is reluctant to overburden its foreign debt, thereby limiting the potential for nuclear growth.

emissions from the PRC by investing the incremental costs of nuclear development to promote CO₂ mitigation. In fact, this is the only feasible, cost-effective approach to attain global Gt-scale CO₂ mitigation in the near future.

Nuclear power reactor operations generate radioactive waste. Because China has operated plutonium-production reactors for years, it has some experience in the treatment of similar radioactive wastes. Waste treatment technology for high level radioactive wastes has been developed and commercialized. However, uncertainty still exists regarding the reliability of underground storage of very long-life transuranic radionuclides over millions of years. There has been recent progress with the burning of these radionuclides in a fast reactor: the PRC has a fast reactor program, and a prototype FBR is under construction. In this way, the problem of the storage of high level wastes may be solved in the near future.

Presently, there is virtually no anti-nuclear power movement inside the PRC. The reasons for this are three fold. First, power concerns in a fast growing economy override environmental concerns. Second, according to scientific analysis, nuclear power is a cleaner fuel than

Table 7. Summary of Fatality Risks of Coal and Nuclear Power Systems

coal. Many Chinese people, including many environmentalists, therefore prefer nuclear to coal. Third, the Chinese people have less opportunity to openly protest against governmental programs. As a consequence, no foreseeable significant anti-nuclear movement will emerge and affect the Chinese nuclear program in the near future.

3.4 Non-Proliferation Concerns

The PRC is a country with nuclear weapon capabilities. Importing nuclear power reactors has nothing to do with the proliferation of weapon technology to the PRC *per se*. This argument — held by some foreign critics — lies in the fact that imported nuclear power technology may enhance China's capability to transfer weapon technology to a third country. This argument has little scientific or political ground. In fact, a nuclear weapon program is based on either uranium enrichment or a non-power plutonium production reactor. A nuclear power reactor is not a practical source of weapons material. Proof of this can be found in the recent agreement signed by the United States, South Korea and North Korea. The United States and South Korea agreed to supply two large PWR nuclear power stations to North Korea and provide significant funding to North Korea in exchange for the termination of North Korea's weapons program. In this instance, cooperation on trade in nuclear power can be seen as a

means of non-proliferation.

IV. Conclusion

Nuclear power is the best practical means for large-scale Chinese CO₂ mitigation: it has the potential to support growing Chinese energy needs. In combination with proven Chinese energy efficiency standards and an increase in the use of hydroelectric power, nuclear power will provide a clean, safe alternative to meeting the demands of a continuously expanding Chinese economy.

The criticisms of nuclear power expansion in China are unfounded: nuclear power is a much cleaner burning fuel than coal, has less radioactive risk potential than coal, and does not incorporate any of the environmental and social disruptions of hydro power. In addition, U.S. concerns over Chinese non-proliferation are unrealistic because civilian nuclear technology is not the key to developing military nuclear capability.

For these reasons, nuclear power should not only be viewed as a viable energy alternative in China, but should be also pursued by the Chinese as an environmentally sustainable energy option and supported by the global community through financing and bilateral CO₂ quota sales. Only with Chinese cooperation can any true progress be made in the substantial reduction of global CO₂ emissions — □ worldwide assistance for Chinese nuclear power development may be the answer to curbing Chinese emissions.

Endnotes

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China Council for International Cooperation on Environment and Development

by Earl Drake

ON THE EVE OF THE UNITED NATIONS CONFERENCE ON ENVIRONMENT and Development held in 1992, the World Bank, in collaboration with Chinese authorities, produced a major study which identified problems, analyzed causes and assessed policies and programs as follows:

"The interrelationship between environmental issues and economic growth and development is central to any discussion of environmental matters. . . . Unlike many developing countries, China has a comprehensive set of laws to guide environmental policy development; a range of command-and-control as well as economic incentive approaches to implement the law; and an impressive network for administering, monitoring and enforcing environmental policy. However, while past efforts have somewhat reduced pollution per unit output, these gains have been mostly canceled by the rapid growth of the economy and the population and by industry's continued high share in GDP."

It was in this atmosphere of international and domestic concern about environmental issues that the Chinese Government established the China Council for International Cooperation on Environment and Development (CCICED).

In opening an early session of the CCICED, China's Vice Premier Qian Qichen challenged the Council with these words:

"How then, can we meet the oppor-

tunities and challenges facing human beings and bring our world into a more promising 21st century? Extensive and effective international cooperation is the only sensible alternative. Environment and development is one of the areas where such cooperation is most needed and most vividly manifested. Over two centuries of industrialization has left us a neglected planet, degenerated ecosystem and slowed development. . . . I hope that the Council will continue to act as a bridge between China and other countries in cooperation on environment and development by introducing useful experience of other countries to China and communicating to the world the determination and aspiration of the Chinese Government and people for sustainable development."

I. Description of Project — Phase I (1992-96)

Organization

The CCICED is a high-level, non-governmental, consultative organization. The stated purpose is "to further strengthen cooperation and exchange between China and the International Community in the field of environment and development." Its inaugural meeting was held in Beijing in April 1992. The Council was initially given a five-year mandate. Subsequently, it was decided to extend the mandate for another five years until the year 2002.

The Bureau consists of the Chairman and Vice-Chairs of CCICED; it acts as the executive of the organization. The chair is Dr. Song Jian, State Councilor and Chairman of the Environmental Protection Commission of the State Council. The three Vice-Chairs are:

Prof. Qu Geping, Chairman of the Environmental Protection Committee of the National People's Congress; Mr. Gu Ming, former Chairman of the Legal Committee of the National People's Congress (he is likely to retire and be replaced soon) and Dr. Huguette Labelle, President of the Canadian International Development Agency (CIDA).

The Council, which meets annually, is composed of approximately fifty Chinese and international members. The members on the Chinese side are of Ministerial or Vice Ministerial rank together with several eminent Chinese experts. The international members are of comparable stature. The members participate as experts in their personal capacities at the invitation of the Chinese Government. They have been chosen for their expert knowledge and experience and come from different fields of expertise: environment, economics, science, technology, energy policy, agriculture, industry, business, finance, and education. The Chinese members come from Ministries and Agencies directly concerned with the central issues of economic development and the environment. Many of the Chinese members are from the Environmental Protection Commission under the State Council, facilitating coordination of domestic and international issues.

Individual membership of the Council fluctuates as people change positions. However, among the 25 Chinese members, there has always been senior representation from the following agencies: National People's Congress, State Planning Commission, State Economic and Trade Commission, State Commission for Economic Restructuring, State Science and Technology Commission, Development Research Centre of the State Council, the Ministries of: Foreign Trade and Economic Cooperation; Chemical Industry; Construction; Agriculture; Coal Industry; Forestry; Water Conservancy; Electric Power; Geology

This piece is the first in a series of articles which will describe the work of ongoing cooperative international projects on the environment in China.

and Mineral Resources; Foreign Affairs; and Finance, National Environmental Protection Agency, Chinese Academy of Sciences, Beijing and Qinghua Universities, Chinese Association of Science and Technology, and China Meteorological Administration.

The international members come from a wide range of countries including Japan, Malaysia, India, Indonesia, Italy, Germany, Britain, the Netherlands, Sweden, Norway, Switzerland, Canada, the United States, Guyana and Kenya. Professional backgrounds have included current or former Environment Ministers, Heads of Non-Governmental Organizations, and business

year but occasionally they will hold additional meetings or workshops. These meetings are generally held in China, often far from Beijing where experts can observe environmental problems first hand.

The National Environmental Protection Agency (NEPA) has been designated as the responsible Chinese organization for CCICED. It has established a small Headquarters Secretariat (HS) in Beijing to support the operations of the Council. The Secretary-General is Mr. Xie Zhenhua, the Administrator of NEPA.

A Canadian Secretariat (CS) has been formed at the David See-Chai Lam Centre for International Com-

allocated to Expert Working Groups, \$1.7 million to Council meetings and \$1.9 million to Secretariat and consultant expenses. The contributors were: Canada, \$3.4 million; China, \$.9 million; and others, \$2.2 million. Other forms of support and collaboration were received from the World Bank, UNDP, the Asian Development Bank, the U.S. Environmental Protection Agency and other organizations.

II. Terms of Reference of Expert Working Groups (WG)

Energy Strategies and Technologies WG

The key energy issues ad-

The stated purpose [of the CCICED] is "to further strengthen cooperation and exchange between China and the International Community in the field of environment and development."

leaders.

The Council has established several expert Working Groups (WG), each jointly chaired and staffed by Chinese and international experts. Initially, the following six groups were formed: Energy Strategies and Technologies; Pollution Control; Monitoring and Data Collection; Scientific Research, Technology Development and Training; Resource Accounting, Environmental Economics and Pricing Policies; and Protection of Biodiversity. In 1994, a new WG on Trade and Sustainable Development was created. The WGs analyze important problems that China faces in the field of environment and development, propose strategies based on international experience and China's needs, and prepare preliminary recommendations for the Council. The latter decides what recommendations to forward to the Chinese Government. Council Members present these recommendations in person to a senior Chinese leader at the conclusion of their deliberations. Normally, each WG will meet twice a

year but occasionally they will hold additional meetings or workshops. These meetings are generally held in China, often far from Beijing where experts can observe environmental problems first hand.

International Support

Canada has always been the "lead" donor of CCICED, but the Council is structured to encourage the involvement of other international organizations and agencies. To date, direct financial support has been contributed by the British Overseas Development Administration (ODA), the Ford Foundation, the Rockefeller Foundation, the German Agency for Technical Cooperation, the Netherlands' Environment Ministry, Global Industrial and Social Progress Research Institute of Japan, the Norwegian Agency for Development Cooperation (NORAD) and the European Union. The budget for 1992-1996 was \$6.5 million with \$2.9 million

allocated to Expert Working Groups, \$1.7 million to Council meetings and \$1.9 million to Secretariat and consultant expenses. The contributors were: Canada, \$3.4 million; China, \$.9 million; and others, \$2.2 million. Other forms of support and collaboration were received from the World Bank, UNDP, the Asian Development Bank, the U.S. Environmental Protection Agency and other organizations.

Pollution Control WG

The objectives are: to study and analyze the present pollution situation; to study future trends of environmental pollution in China; to review China's experiences in pollution control while drawing on the practices and lessons of advanced and newly industrializing nations; to undertake in-depth studies on the priorities in combating industrial and urban pollution as well as pol-

lution of major waterways and watersheds; and to offer recommendations to the Chinese Government on the objectives and policy measures of pollution control for the coming decade.

Monitoring and Data Collection WG

This working group started with a systematic approach and standardization to improve the monitoring network. Its objectives are: to set up a new indicator system and develop the information system to support optimal pollution control; to make full use of existing scientific findings and coordinate difficult cross-sector issues; and to learn from the experience of other countries in order to be able to propose realistic programs.

Scientific Research, Technological Development and Training WG

The objectives of this working group are: to carry out research on environment while engaging in technology development; to review the current policies on environment and development from the angle of science; to analyze the current situation, problems and priorities in scientific research, technology development and training; to provide the optional strategies and recommendations required in formulating long-term policies; and, enhance the environmental awareness of the public to help develop the scientific capacity for sustainable development.

Resource Accounting and Environmental Economics WG

China is currently experiencing a massive structural change in its economy, characterized by a rapid shift from an administered system to one which is becoming increasingly reliant upon market forces. It is recognized, however, that the market alone cannot satisfactorily address all development issues. Although rapid changes are taking place, resource prices in China still tend to be unrelated to the true eco-

nomic, social and environmental costs resulting from their production and consumption. Given this, the working group has been established to conduct research on current natural resource pricing in China, and to recommend policy reforms which meet multiple objectives of economic efficiency, social equity, and sustainable development.

Protection of Biodiversity WG

The functions of this working group are: to analyze and review information on China's biological diversity, including information on its use, and to propose surveys and research to remedy deficiencies in this knowledge base; to bring together the relevant government agencies and scientific institutions in China, and appropriate governmental and non-governmental organizations concerned with the conservation and sustainable use of living resources and biological diversity; and to propose strategies and actions for the conservation and sustainable use of the nation's biological diversity and living natural resources.

Trade and Sustainable Development WG

This Working Group assists China in developing and implementing long-term, comprehensive and integrated trade and environmental policies and measures that are supportive of sustainable development. Research subjects include the role of trade in China's Agenda 21; lessons learned from the experience in other countries and regions; the role of Multilateral Environmental Agreements; and the transfer of environmental technologies.

III. First Recommendations to the Chinese Government by CCICED

The heart of the CCICED process is the annual presentation of recommendations by Council Members directly to a Senior Chinese Leader, such as the Premier (who

has met with it three times). These are then considered by the State Council which reports on its follow-up actions to the next meeting of the Council. The first recommendations and the Chinese responses are presented here to illustrate the process.

Recommendations

The Council provided a detailed study to the Premier on the means by which sustainability can be achieved. It identified some priorities and formulated the following recommendations:

1. Energy is critical. At present, dependence on coal is a prime cause of pollution and contributes to global as well as local climate change. It is necessary to promote:

- Energy conservation and efficiency in domestic and industrial use;
- Clean coal technologies; and,
- Alternative renewable sources of energy.

2. China is rich in biodiversity. Its continued destruction could cause enormous damage to the economy by weakening its natural base and depriving China of its potential for future food, medicine and other materials. It is necessary to:

- Strengthen the system of terrestrial and aquatic protected areas; and,
- Restore degraded habitats to ecological productivity.

In order to achieve this, China should:

- Enlist the indispensable help of local communities, and,
- Cooperate with neighboring countries to create regional agreements on the prevention of trade in endangered species. In this respect, China should convene a regional conference on the issue.

3. Food security is a vital issue for China. China should give its highest attention to agricultural growth, especially to proper land use planning, water use planning and ecological agriculture. China has, in

this connection, accumulated valuable experience, which should be emphasized for further practice and popularization.

4. Correct valuation and pricing of resources is the key to a sustainable economy. It is necessary to:

- Develop and adopt resource pricing policies which reflect environmental and social costs;
- Remove inappropriate subsidies;
- Improve the present National Economic Accounting System by incorporating environmental costs into it; and,
- Develop and use economic and fiscal instruments for environmental management and pollution control.

5. Nothing is possible without public understanding, support and participation. Taking this into account, it is necessary to:

- Disseminate environmental information to the public through the media;
- Carry out environmental education at various levels, paying special attention to youth and women;
- Establish mechanisms which will guarantee public participation;
- Consider public choices and wishes; and,
- Encourage the public to exercise supervision of behavior that causes damage to the environment.

6. Allocate adequate funds to support the implementation of environmental laws, standards and regulations.

7. As an important member of the international community, China should play an active role in international efforts to cope with global environmental problems. For example, China should make efforts to reduce atmospheric carbon emissions which are related to international efforts.

Given the traditional Chinese antipathy to horizontal coordination among its own work units and suspicion of foreigners, it is quite remarkable that, in the case of CCICED, China has agreed to some coordination among Chinese Ministries and the involvement of foreigners.

IV. First Chinese Responses to CCICED Recommendations

The Chinese Government presented a detailed response to the Council at its next meeting. I quote its opening words and then summarize the new measures which were announced. "Last year, the Chinese and international members of the Council put forward seven constructive recommendations which won the very high appreciation of President Jiang Zemin. The Chinese Government has shown concern for the areas covered by the recommendations. Following serious study, these recommendations have already been implemented or are being put into practice."

1. Improve energy efficiency

• Major achievements were made in introducing clean combustion technology and increasing the energy utility rate by way of strengthened international cooperation. Such projects included desulphurising boilers and the selection of clean coal in Chongqing, heating power supply from Shijinshan to Beijing, renovation of kilns and boilers with gasification in Tangshan, etc.

• A Power Industry Plan was worked out, focusing on the development of big units and renovation of aged plants, aimed at reduction of coal consumption by 17% by the year 2000.

2. Protect biodiversity

• A Country Program for the protection of biodiversity is being drafted.

• The State Council issued a Circular on Banning Trade of Rhino Horns and Tiger Bones.

• Area of nature reserves will increase from 6.7% of the total territory to 10% in 2000.

3. Protect agricultural environment

• The State Council approved Regulation of Basic Protection of Farmland, further defining rules on prevention and control of farmland pollution and destruction.

• A large number of eco-townships, villages and counties were created.

• Ministries required registration and evaluation of fertilizer to meet environmental standards.

4. Use resource accounting and economic instruments

• 12 provinces started a pilot project to collect eco-environment compensation from resource utilization with a view to establishing an economic mechanism for rational use of resources.

• In order to promote rational use of water, an extra charge was added to every ton of waste water discharge.

• There was discussion on implementing environmental taxes, starting with CFC and lead-petrol products.

5. Enhance public participation in environmental protection

• NEPA and relevant organizations held the first Youth Environmental Forum and the first Women's Conference on Environment.

• A media campaign was organized to expose the public to environmental problems and publicize the need for environmental protection.

6. Enact environmental legislation

- In the next five years, the National People's Congress will promulgate eight laws for environmental protection, covering atmospheric, water, noise, and radioactive pollution and control of marine environment, solid wastes and toxic chemicals.

7. Activate China's global role

- China reported to the CCICED on its implementation of Agenda 21, the Basel Convention, the Biodiversity Convention, the Montreal Protocol, the Convention on the International Trade of Wild Flora and Fauna and the UN Convention on Climate Change.

V. Phase II (1997-2001)

The Chinese & Canadian Secretariats, acting under the direction of the CCICED Bureau, submitted a paper on the future of the Council to its Members at their meeting in September 1995. Members supported the continuation of the Council as proposed and asked that some of their suggestions be incorporated into the work of the Council. The meeting concluded that: CCICED is a unique international experiment in international cooperation. Council Members concluded that the results of Phase I merit extending the mandate of the Council for a further period covering the years 1997-2001. However, they wish to recommend some modifications to the Council in the light of experience and China's changing needs.

Objectives

- The Council should continue to concentrate on its main objectives:
- Advise the Government of China in the definition and implementation of long-term, integrated strategies and policies that promote sustainable development;
- Encourage international cooperation as a means to address environmental and development issues in China; and,

- Advise and assist in efforts to encourage a better public understanding and awareness of environmental issues in China.

Within that broad mandate, the Council should concentrate in Phase II on making its advice and cooperation as practical and as expeditious as possible in addressing China's priority needs. In giving policy advice, the Council and its Working Group's will be asked to go beyond proposing "what to do" and to add concrete proposals on "how to implement the policies." This would not involve funding, designing in detail or implementing any full-scale projects; CCICED would stop at outlining demonstration projects to be financed by donor agencies.

Practical Elements

Chinese decision-makers have asked that, whenever possible, the Council's policy advice should be supplemented by concrete, pilot projects. These projects should demonstrate the implementation of proposed policies by testing them in an affordable way, at a specific location, and within a limited time-frame. This practical approach would affect various levels of CCICED activity: Council Members might set a more pragmatic tone and direction in their Annual Meetings. In addition, some Council Members might be able to help during the year in various ways, e.g., by preparing papers at the request of Council, chairing Working Groups, or helping to attract financial support from donors for Council activities and demonstration projects; and, Working Group experts might be specifically charged by the Council with producing policy recommendations and ideas on how to implement those policies. They could also identify concrete pilot projects which are affordable and implementable within the next five-year plan. In addition, they could be asked to give more emphasis to holding their meetings, seminars and workshops

in the field where they can study acute environmental problems first-hand. Representatives of potential donor agencies could be invited to some of these meetings.

Chinese end-users need to be identified and brought into the policy formulation process. These end-users include National, Provincial and Municipal levels of government and enterprise management in several sectors (e.g., not just Environmental Protection officials but also energy producers and distributors, water authorities, State Planning officials and Finance officials worried about inflation, etc.). Chinese Council Members and Working Group experts would be responsible for identifying relevant end-users and promoting their collaboration with the Council.

Council Membership

The Council should maintain its membership of approximately 50 Chinese and international members of Ministerial rank or comparable stature. Members will continue to participate as experts in their personal capacities at the invitation of the Chinese Government. All current Memberships will terminate at the end of 1996; it is anticipated that China will ask approximately half of the current Members to accept a second term and will invite some new Members to join the Council.

Expert Working Groups

There should continue to be approximately seven Working Groups, jointly staffed by Chinese and international experts. These working groups should draft multi-year work plans and report annually to the Council. It is anticipated that two of the existing Working Groups will complete their work by 1996 and will be retired (Monitoring and Data Collection; and Science and Technology), five existing Groups will be asked to continue their work and two new Groups will be added (Sustainable Agriculture and Cleaner Production).

VI. Coordination and Effectiveness

China is the prime example of a developing country which does not want its economic development program coordinated by any outsider. It has resisted being incorporated into the international network of Consortia and Consultative Groups chaired by the World Bank. It has also resisted the less formal donor coordination groups which the UNDP offers to chair in the capitals of many developing countries. China has been reluctant to accept the good offices of these organizations despite its excellent relations with both of them.

Given the traditional Chinese antipathy to horizontal coordination among its own work units and suspicion of foreigners, it is quite remarkable that, in the case of CCICED, China has agreed to some coordination among Chinese Ministries and the involvement of foreigners. An outsider can only speculate that this unusual degree of coordination may be due to the following factors:

- Control is very firmly in the hands of China. It is a Chinese Council not an international organization. All Members and Working Group Chairs are invited by China and maintain their membership at the discretion of China.
- All Council meetings are chaired and all executive actions are taken by the Bureau, which has one Chinese Chair, two Chinese Vice-Chairs and only one international Vice-Chair;
- Environment is recognized as a special subject that has international significance and where China is a party to several global conventions;
- Environment is a field where China hopes to attract foreign financing and technology;
- The amount of funds being administered is very small;
- The terms of reference are limited to broad policy advice and do not include the coordination of major fund-raising or the implementation of projects in the field;

- Chinese coordination is left to a Chinese agency (NEPA) which has little power and does not pose a threat to any other Ministry. Moreover, NEPA had already been designated as the Secretariat for the Interdepartmental Environmental Protection Commission of the State Council (whose membership is largely the same as the Chinese membership of CCICED); and,
- International coordination is mostly left to a non-threatening and distant country (Canada).

Effective coordination of the CCICED is hampered by the absence of any rules or guidelines on donor roles, burden sharing, or information exchange and by the low-key role of the Chinese Secretariat. While the Chinese are keen on the symbolism of Chinese leadership, they do not in fact play a very assertive role in leading the debates in the Council, in preparing workplans for the Expert Groups or in performing the secretariat function. Much of the initiative and much of the detailed follow-up on these matters comes from the international side. To take successful initiatives without causing the Chinese hosts to "lose face," often requires considerable sensitivity and skill on the part of the foreigners. Some are better at it than others. In retrospect, it is amazing how well all participants have adapted to this unusual way of working.

In conclusion, it can be said that the Council is unique in many ways. It has been successful in engaging the attention of a remarkable collection of senior Chinese officials and leaders at least once a year on major questions of environment and development. Since the Council began, the Chinese Government has regularly produced action plans, budgets, environmental standards and laws consistent with Council recommendations. Taken together, they constitute the world's most impressive response to the 1992 U.N. Conference on the Environment. Regrettably, it is impossible to

measure how much of these splendid words are attributable to the work of the Council and how much to other influences. The biggest question, however, is how effective these paper plans will be in effecting real progress in the many polluted towns and threatened ecosystems of rapidly industrializing China.

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