China Security

中国安全

Bringing Chinese Perspectives to Washington

Summer 2006

China's Defining Challenge: Energy

Energy Interdependence
Zha Daojiong

Sea Power and China's Strategic Choices
Zhang Wenmu

The Oil Weapon: Myth of China's Vulnerability
Bruce Blair, Chen Yali, and Eric Hagt

Energy Conservation as Security
Wang Qingyi

Institutional Insecurity
Kong Bo

Politics vs. Market
Mao Yushi

A publication of the World Security Institute China Program
www.wsichina.org

China Security
中国安全
www.wsichina.org
Summer 2006

China Security

Bruce G. Blair *Publisher*
Eric Hagt *Editor*
Chen Yali *Associate Editor*

Assistant Editors
Daphne Dador, Jason Hecht,
Theresa Hitchens, Cindy Li, Whitney Parker

Ann Li *Production Editor* Guan Yu *Production Designer*

Manuscript Reviewers
David Chen, Dean Cheng, Gregory Kulacki, Jeffrey Lewis,
James Clay Moltz, Victoria Samson, David Wright, Yuan Jingdong

Editorial Board
Jeffrey A. Bader Brookings Institution
Richard K. Betts Columbia University
Thomas J. Christensen Princeton University
Philip Coyle World Security Institute
Lowell Dittmer University of California, Berkeley
Bates Gill Center for Strategic and International Studies
Theresa Hitchens World Security Institute
Joan Johnson-Freese Naval War College
Albert Keidel Carnegie Endowement for International Peace
Nicholas R. Lardy Institute for International Economics
Li Bin Tsinghua University
John J. Mearsheimer University of Chicago
Mike M. Mochizuki George Washington University
Michael E. O'Hanlon Brookings Institution
Jonathan D. Pollack Naval War College
Shen Dingli Fudan University
Shi Yinhong Renmin University of China
Teng Jianqun China Arms Control & Disarmament Associastion
Frank von Hippel Princeton University
Xue Lan Tsinghua University
Yuan Peng China Institutes of Contemporary International Relations
Zha Daojiong Renmin University of China

This issue was made possible through the generous support of
the Robert and Ardis James Foundation

Published by the World Security Institute and produced jointly with the Chen Shi China Research Group

World Security Institute
1779 Massachusetts Ave. NW
Washington, D.C. 20036
www.worldsecurityinstitute.org

Chen Shi China Research Group
Suite 2480 Sunflower Tower
37 Maizidian St. Chaoyang District
Beijing, 100026 P.R.China

Contents

Zha Daojiong	**Energy Interdependence**	**2**
Zhang Wenmu	**Sea Power and China's Strategic Choices**	**17**
Bruce Blair, Chen Yali, and Eric Hagt	**The Oil Weapon: Myth of China's Vulnerability**	**32**
Kong Bo	**Institutional Insecurity**	**64**
Wang Qingyi	**Energy Conservation as Security**	**89**
Mao Yushi	**Politics vs. Market**	**106**

Energy Interdependence

Zha Daojiong

A Critical Juncture

The rapid pace of growth in China's total energy consumption over the past decade and the seemingly unrestrained rise of oil prices have generated a critical mass of discussion about China's energy security. The principle concern over energy security in China is the perception that the Chinese economy is highly dependent on a stable supply of energy and cannot tolerate the slightest interruption or shortfall. In light of this, it is crucial to note that since China became a net importer of oil in the early 1990s, there has not been a single case of deliberate disruption of its foreign supply.

What about the future prospects of disruption? There will be numerous pitfalls along the way, but managing the growing levels of interdependence between China and the rest of the world provides the best assurance against acts of hostility by either foreign suppliers or third parties. Achieving this depends both on China's own energy policies, as well as the role of international actors in China's search for energy security.

Energy security is not simply the combination of energy and security. This distinction is particularly relevant when international factors come into play.

Zha Daojiong *is an associate professor of international relations and chair of the Department of International Political Economy at Renmin University of China. He is an expert on Chinese energy policies, politics and diplomacy, as well as non-traditional security issues. Zha is the co-author of* Building a Neighborly Community: Post Cold War China, Japan, and Southeast Asia *and* The Political Economy of China's Oil Security.

China Security, Summer 2006, pp.2 - 16
©2006 by the World Security Institute

Energy security contains three essential goals: the availability of energy needed for stable economic and social development, freedom from interruption of the energy supply, and the affordability of energy prices. As such, thinking about possible instruments for achieving energy security does not have to begin by assessing a nation's military options. Considerations of energy and security, on the other hand, have more to do with geopolitical factors and the national policies of countries affecting the control of energy development and transportation around the world. Distinguishing between these two ideas is more than an academic exercise. Energy security, as defined above, goes more to the heart of realizing a nation's well-being, but it must also take into consideration issues involving energy and security.

Availability

The availability of energy resources is first and foremost conditioned by geological endowment. The second determinant is the scientific and technical means for exploration and production (E&P). A case in point is the oil fields of Daqing (in northeast China). Prior to their discovery in 1959, there was an international consensus that no oil, or at least no commercially significant amount of it, was expected to be found in China.[1] In stark contrast, after the first world oil crisis of 1973, there emerged wild expectations about China becoming a viable alternative to the Middle East as a primary oil supplier for its Asian neighbors. Since the mid-1980s, however, the pendulum has swung once again to a more pessimistic, albeit realistic, estimation of China's oil potential. There is presently a new international consensus: domestic oil production in China is set to stagnate or decline, making it increasingly imperative that China seek supplies abroad to meet its energy needs.

This does not necessarily mean a narrowing of opportunities for international cooperation for China to increase its domestic oil supply. On the contrary, improving homeland supply provides a reason to acquire advanced science and technology to enhance China's oil recovery rate (the amount of oil acquired from the ground against estimates of available reserve). In the past few years, China's oil recovery rate has declined to approximately 27 percent, with a production level of 182 million tons of crude oil in 2005, or roughly 56 percent of the country's total oil consumption.[2] Investment in science and technology – including through international collaboration – can improve

the amount of available supply. Indeed, any increase in China's domestic oil supply will help reduce the pressure in the global oil market.

Commitments to E&P projects by oil companies, both Chinese and international, are extremely time-sensitive because there is pressure from impatient shareholders, who are constantly seeking to divert capital to the most profitable outlets. This law of business demands that the government provide robust financial and legal incentives for E&P projects that are viewed as risky by oil corporations. Chinese oil companies often complain about insufficient government support for high-risk E&P initiatives in China. If such complaints are well founded, then international concern over China's growing appetite for offshore energy should motivate government-business dialogue in order to improve China's domestic oil recovery rates in developed oil fields and the search for new ones.

Likewise, China needs to seek ways, including through international cooperation, to augment its oil refining capacity. Technological bottlenecks in refining place a limit on the amount of heavy oil China can process (currently heavy oil makes up about one-third of total crude imports).[3] Deficits in oil refining technology also mean that Chinese oil refiners cannot produce oil products with the same profit as their international peers, obligating China to import substantial amounts of high-quality oil products. In this regard, the benefits for multi-national investors and companies in China's oil refining sector are similar to other foreign direct investment projects therein: comparatively lower labor costs which can lower production costs. It goes without saying that such investments are conducive to ameliorating the competitive impact China is having on the global oil markets.

The policy of using coal as the primary source of energy supply was developed in large part as a response to the mounting international outcry about a "China threat" to global energy supply.

The Basic Necessity of Coal

Coal is and will continue to be the primary source of energy in China as domestic resources are abundant.[4] Energy specialists generally agree that there is a sufficient endowment of domestic coal to sustain China's present consumption for decades to come. Conversely, the pressure to address the

environmental and social consequences of China's coal mining industry is gathering. One of the most pressing challenges is to reduce the number of coal-mining accidents.[5] Fatalities from coal-mining disasters accounted for an astounding 39 percent of all deaths related to workplace accidents.[6] Beginning in 2003, the government mustered the political will to allow media exposure of such accidents, in part due to the lessons it learned from the mishandling of the severe acute respiratory syndrome (SARS) crisis.[7] But media coverage in and of itself is not sufficient to address the general malaise of the industry and the dangers it holds for social stability.

It is unfortunate that the central government has made mei wei ji chu (coal as the basic source of energy supply) the main pillar of its energy strategy.[8] It should be stressed, however, that this policy was developed in large part as a response to the mounting international outcry about a "China threat" to global energy supply.[9] This national plan is leading to unintended consequences. It is often abused by all levels of government simply because approving a new coal mining project does not entail much of a new demand for investment in technology – cheap labor and migrating rural labor is still abundantly available in China. This abuse also has long-term consequences since officials can opt out of supporting financially risky projects for developing alternative sources of supply, such as renewable energy. Indeed, it is safe to say, that mei wei ji chu counteracts much of the positive impact of China's law designed to promote the development of renewable and alternative energies. It also contradicts the notion of "green GDP", an indicator designed with the purpose of assessing the performance of local government officials in promoting cleaner energies and reducing pollution.

《中国安全》季刊

征稿

《中国安全》季刊欢迎中美两国学者、军界及政府官员、商界、科技界及金融界人士的投稿。季刊每期关注一个同中国未来走向紧密相关的主题，同时接收深度分析中国安全挑战的时政问题稿件。投稿须是未发表的原创论文、为学者型深度分析而非评论、须有引文出处的中文或英文稿件。

投稿可由电子邮件发至：
publications@wsichina.org
或者邮寄至：

China Security
Editor
China Program
World Security Institute
1779 Massachusetts Ave. NW
Washington, D.C. 20036

Calculating the Risks

At the same time, the government must also be highly sensitive to the requisites for maintaining stable economic and social development, including the timely and dependable provision of energy. Like in all other countries, Chinese society has a limited tolerance for shortfalls in energy supply. The challenge, then, for China's energy security policy is to factor in risk-taking by the energy industry within the domestic arena. In this regard, dialogue with international actors over energy should include the sharing of technological expertise and management of know-how for Chinese energy corporations to lower such risks in China. This is most definitely not an issue of intellectual property rights and cannot be delayed.

In 2005, the Chinese government belatedly announced a policy goal to achieve a 20 percent reduction in energy consumption per unit (GDP) production by the year 2010 (compared with 2000 levels).[10] Such a move indicates a realization by the central leadership that it must begin putting a brake on the current path of high-speed growth at any cost. However, conservation can be financially costly (and politically costly for sub-national officials if they fail to achieve high growth). Therefore, political resolve – made enforceable through financial, administrative, and legal means – is a key prerequisite. The target may well be missed but it will be far more damaging if the policy momentum towards more efficient energy consumption either fails to emerge or cannot be sustained.

As is true of most countries, streamlining the domestic energy industry with the aim of boosting domestic supply cannot be a replacement strategy for acquiring energy supply from international markets. The fact that 43 percent of China's total oil consumption in 2005 came from imported sources is often cited in the media as proof of the risks China is facing in securing its energy supply.[11] Yet, this sense of insecurity has to be put in context.

China is not the only country that is dependent on offshore sources for energy supply. Energy suppliers (both states and companies) are also dependent on China for sustained demand. The economic law of supply and demand is such that energy suppliers outside China cannot afford to lose China as a customer. Indeed, the phenomenon of China being the "factory for the world" speaks volumes about the associated high costs to international investors and consumers (and the foreign economies they are rooted in) should the Chinese economy suffer from a deliberate disruption of energy supply.

Naturally, there are political and geostrategic factors regarding the global energy markets that lurk around the corner and cannot be ignored. However, for the time being, the powerful business logic that can and should govern the global energy trade should be emphasized. In a strategic business sense, a key instrument for encouraging the global flow of energy to China would be to allow the domestic price levels to rise above international and regional averages. This would provide energy developers and traders the single most powerful incentive not to disrupt supply to China. It would also motivate them to mitigate political interference in business interactions between China and the rest of the world in the realm of energy.

> There has not been a single case of deliberate disruption of China's foreign energy supplies.

In short, the availability of supply is central to the conundrum of achieving energy security for China. The solutions to this are multiple. It is particularly vital for China to improve its domestic energy industry, both in terms of rationalizing production and in demand management. When viewing China's importation of energy from foreign sources, more attention must be paid to the mutual dependence between China as consumer and the world's energy suppliers/producers.

Supply Interruptions

Interruption of available energy supply can occur due to a variety of technological, natural, and political causes. Within the domestic context, the Chinese people are quite familiar with supply interruption resulting from technical failures or the policy and technological inadequacies in dealing with natural calamities. Such stoppage is usually limited in geographical scope and in duration, and therefore is often treated as a matter of technological safety.

Disruption of supply is an energy security issue when the movement of foreign energy resources into China becomes problematic. Yet, as stated at the outset of this paper, there has not been a single known major incident of deliberate interruption since the early 1990s, making such issues primarily psychological in nature. Although there is no physical evidence to support these fears, they have a deep impact on thinking about China's future fate in the global energy markets. This fear is exacerbated by the discussion among the major world powers of a "China threat" to their respective energy supplies.

There are a wide range of views in China about how to address the risks of deliberate disruption to its energy supply. Regardless of where one stands on this issue, it is essential to note that China's dependence on maritime energy transportation is a natural state of affairs that must be managed. The Taiwan Straits situation is perhaps by far the single greatest challenge to putting concerns about maritime energy transportation security to rest. In the scenario of war across the Taiwan Straits, there is no guarantee that the United States would not enlist the assistance of its principal ally in northeast Asia (Japan) and other lesser allies (Singapore, the Philippines, and South Korea) to participate in another oil blockade against China. The comprehensive embargo the United States launched after the Korean War serves as a powerful reminder of such a nightmarish scenario.[12] Furthermore, expectations that Hong Kong may help offset the impact of an oil blockage against China, as it did to some extent during the U.S.-led embargo from 1950 to 1971, will likely prove misplaced. Hong Kong may even be included in a future blockade, now that it has become a special administrative region of China.

The Pipeline Option

Oil and gas pipelines from Russia and Central Asian states to China make good strategic sense given the frequent reappearance of a competitive relationship between China on the one side and Japan and the United States on the other. In times of peace (or at least no war), oil pipelined from Russia can be more economically transported to areas of high-consumption regions – by population and industry – along China's eastern coastline. In a similar vein, oil and gas pipelines from central Asia are useful not just for importing oil and gas, but also for cutting the transportation costs of moving oil from the east to the west of China.

During times of war, ships carrying oil and gas would be vulnerable to naval interception, even within the distance between Dalian in the north and Guangzhou in the south. However, pipelines over land would certainly not be immune from aerial attack. Oil transportation routes, whether on land or at sea, would be justifiable military targets simply because a modern military relies on oil to move its armor and personnel to the front line.

An oil pipeline from Burma through southwestern China is another case in point. This is passionately argued for on the strategic grounds that

it would reduce China's vulnerability in relying on the critical geostrategic chokepoint, the Straits of Malacca.[13] However, the formidable geographical and geological challenges to maintaining such a pipeline beg the question of its economic viability. Transporting oil out of the southwestern province of the Yunan-Guizhou plateau for consumption in eastern and southern parts of China would not be a feasible market solution. Consideration of oil pipelines should be constrained within the context of economizing oil transportation inside China, and should not be elevated to a larger national energy security issue.

> In war, ships carrying oil and gas would be vulnerable to naval interception and pipelines over land would not be immune from aerial attack.

Indeed, land-based oil pipelines are just a recent extension of the larger debate in China over national strategic vulnerability. Similar questions were raised about the Three Gorges dam and the entire Chinese coast for constructing civilian-use nuclear power plants.[14] While concern about exposure to foreign military attack was not the sole reason for the slow progress in building up China's nuclear power industry, the concern today about China's dependence on non-domestic sources of oil should serve as another reminder against overly strategic thinking regarding options for energy security.

Instead, awareness about China's geographical vulnerability should be turned into a powerful strategic motivation for cooperation with the powers that have the capacity to adversely affect China's oil supply security. More specifically, China must pursue confidence-building measures with the major powers in the Pacific. It is important to note that since the 1970s, China has lived under the same cloud of vulnerability as it does today. Pursuing land-based means of transporting foreign oil and gas to China, for the sake of minimizing the risk of maritime attack or blockade, is not only against economic logic but also risks turning fear and the psychological element of energy insecurity into self-fulfilling prophecy.

The Untapped Potential of Energy Prices

The setting of energy prices goes to the heart of China's energy security. It is a highly complex issue, but of critical importance is the basic tenet that a

system of energy pricing that accurately adapts to and reflects market fundamentals is essential to the pursuit of sustainable development.

Raising energy prices is very unpopular in China, as it is elsewhere, making this no simple task. Though still largely government-controlled, end-user price of oil in China is quickly approaching the average level of the United States. The Chinese media frequently complain about rises in oil and electricity prices by referring to the per capita income gaps between Chinese and the major industrialized countries. Energy suppliers in China are often accused of being profit-hungry, in addition to monopolizing the domestic energy supply chain.

That said, a further increase in oil prices in China is being, and should be, implemented, even if the pace of that adjustment is debatable. Keeping oil prices low to make room for further growth of such 'pillar' industries as automobile manufacturing is not justifiable. Because automobiles are luxury items of consumption, they should not be afforded preferential policies by the government. It is simply impossible for every Chinese to attain levels of private vehicle ownership available to the majority of developed countries. The construction of sufficient parking space alone is a formidable, perhaps impossible, challenge. This is to say nothing of the pressing problems of resource scarcity and environmental degradation. The government should focus on providing affordable and widely accessible means of public transportation – an issue that major cities in China have only recently begun to address.

The Chinese government has opted to impose stricter fuel emission standards for new automobiles sold in the Chinese market against increasing taxes on oil. This does entail additional costs on international automobile manufacturers operating domestically if they choose to remain in the Chinese market.[15] In this way, higher fuel efficiency in cars takes precedence over reducing the number of drivers taking to the road. Nonetheless, it is certainly in China's own interest and the rest of the world to turn China's automobile industry into a leader in producing fuel efficient vehicles.

The reform of energy pricing and its various permutations in China's socio-economic system opens yet another door for meaningful bilateral and multilateral dialogue on mechanisms to enhance China's energy security. Strategic factors do play a role in thinking about supply interruptions, but it is unwise for China to overreact and implement ideas that run against basic economic logic.

Interdependence or Zero-Sum Competition

There has emerged a pattern in official positioning between the Chinese government and concerned international parties regarding China as a factor in the international energy scene. Chinese officials like to remind their international audience that China is heavily reliant on domestic resources to meet its energy needs, while the latter seek to understand what China is doing and plans to do to address global concerns about the disconcerting energy issues.

Despite this seeming disjuncture in perspectives of China's energy security and its affect on global markets, the nature of China's relationship with the rest of the world can best be characterized as one of interdependence. The now common statement, "China needs the world, and the world needs China," is truer today than ever before. Establishing bilateral and multilateral negotiation and cooperation mechanisms help to both routinize constructive interaction as well as recognize the cost of non-cooperation. This is not a guarantee for success but it greatly lowers the possibility of vicious competition and military conflict. Oil diplomacy is simply not a zero-sum game. In the energy industry, all players, including the U.S. government, American and multinational oil companies, the Gulf oil exporters, Europe, Japan and China can benefit from cooperation. The clear-eyed recognition of interdependence as a crucial element in the complicated international political and economic interaction should provide a powerful inspiration when considering China's oil supply security.

It is also important to keep in mind that historically the United States has been a force that has expended significant effort to uphold the economic rules of the market operations worldwide. The United States will not likely shy away from using oil to influence or even intimidate other countries' foreign and domestic policy, but will do so mainly with the one strategic goal in mind: making sure oil, especially Middle Eastern oil, flows to the United States and other major oil consumers around the world at an affordable price. Major oil importers shouldn't be overly threatened by the reality of America's dominant influence over the production and supply of the world oil market because suppliers and consumers of oil do not fundamentally have a confrontational relationship but one where each is deeply dependent on the other.

Interdependence is certainly not devoid of ambiguity.

This is especially true of China, whose overall economic development has resulted in a growing reliance on overseas oil and gas resources. At the same time, China's import of energy resources has reciprocally propelled both the growth of the world's oil and gas industry and global economy as a whole. China's increase of oil imports shouldn't be treated as a problem, but rather as a normal phenomenon and part of its growing interdependency with the rest of the world. The fact is that China has benefited as much from the rest of the world as the latter has from China.

However, such interdependence is certainly not devoid of ambiguity. It has developed in ways that are more complicated than in the past. For instance, many have observed that China is currently going through what Japan experienced in the early 1970s.[16] Japan's rapid industrialization of that time contributed to a 'crowding out' of the global energy market leading to a host of contentious issues that required a globally concerted effort to manage and negotiate smoothly. Crucially different than Japan, however, China is presently still not a 'like-minded' entity in the international structure that governs the world economy. For historical and political reasons, both real and imagined, China is seen as challenging the international order that has dominated the world for decades.

Following the end of the Cold War, the United States has established firm control over the Gulf region militarily through two wars with Iraq. Americans have also directly interfered with China's forays into the regional oil and gas markets in the Gulf.[17] A conflict has arisen over the sales of dual-use technologies and equipment. From the U.S. perspective, China's military cooperation and trade of dual-use items with Iran, Iraq, Syria and Saudi Arabia amounts to a weapons-for-oil strategy. This engenders a zero-sum struggle between China and the United States on these issues.[18] From China's perspective, although it did not openly oppose the United States from using force against Iraq with a veto at the United Nations before the second Iraq war, the challenges China is facing in the Gulf region haven't diminished at all. In order to ensure access to a Middle Eastern supply of oil, China finds itself in the uncomfortable position of having to cater to the political demands of some of its suppliers there.[19] The result is an inevitable clash with the United

Americans have also directly interfered with China's forays into the regional oil and gas markets in the Gulf.

States. For instance, in December 2003, the American Embassy in Beijing pressured CNPC into retracting its bid for the exploration of 16 new oil fields in Iran. Because other countries in the Middle East are more hostile to international investments in the upstream, China found it difficult to comply with U.S. demands.[20] The current "China Threat Theory" popular in the United States has extended to beyond just the Asia-Pacific region and into the Gulf region as well.

Managing Interdependence

To best protect China's oil and economic interests, it must work hard with the Gulf exporters to establish a long-term mutual-dependence of downstream and upstream industries. The core of this relationship is for China to purchase the region's petroleum while vigorously encouraging Gulf exporters to acquire shares of the growing Asian energy market with their own investment in refining. The Gulf region is also becoming more and more important as a destination for investment by China's own energy industry, as it actively seeks business opportunities overseas under the 'go out strategy'. The oil economy is the key to linking the growing trade between the two regions. Additionally, the Gulf region is both a potential market for Chinese commodities and an entry point for export further to the greater Middle Eastern region and East Africa. Despite the resistance from the United States and other countries, a firm platform of common interests will emerge between the energy-oriented Gulf countries pursuing economic diversification and a China that strives to maintain its strong economic growth.

Behind China's mutually dependent relationship with the world's energy suppliers is the hardboiled reality that China is the world's third largest energy consumer and continues to grow at a rapid pace. This is not to condone China's wielding of its energy demand as a political bargaining chip when interacting with the rest of the world. It does mean, however, that improving energy efficiency of the Chinese economy is conducive not only to China's core national interests but is also imperative to the rest of the world – given the generally accepted truth about the limits in global availability of fossil-based energy supply and the dangers of global warming.

On the other hand, China should not avoid, nor should it be expected to avert security issues relevant to the international sea lanes of communication,

which China is intensely reliant on for transporting energy. Realists argue that China should accelerate naval build-up because its military self-defense capability lags far behind China's energy interest and military warfare, especially military warfare on the sea, which is the final means for great powers to solve international trade disputes.[21] Although these arguments may sound persuasive if put in a broader strategic context, there are a number of alternatives for international sea transportation channels. Even with regard to the sea lane chokepoints, the advances in the technologies of oil tankers and long-distance transportation makes it is possible to avoid bottlenecks, such as the Malacca Strait. Moreover, any action that involves naval power to protect oil tankers has to take into full consideration the consensus China must achieve with regional countries. However, opening the shipping lanes at the cost of deterioration in diplomatic, military and strategic relations with China's Southeast Asian neighbors begs the fundamental question whether the price is too high.

China's interests in the Gulf region hold no fundamental contradiction to the economic relationship between China and the United States.

The sea lanes of communication and the world oil markets are international public goods. Participation in their maintenance and stability as well as helping shape the institutions and mechanisms that provide that service is an important part of sustaining China's oil security. As a responsible large nation, China has so far played a constructive role toward these goals. For instance, China has both contributed peacekeepers and provided development aid under the UN framework to further peace and stability in those regions. Also, China has adopted measures to address maritime piracy and anti-terrorism under the multiple consultation mechanism within the Association of Southeast Asian Nations. These are largely regional issues pertinent to sea lane safety that not only serve China's own interests but also contribute to the security of Southeast Asia's sea lanes. Looking forward, China should continue to play an active role in combating piracy particularly when it involves criminal elements in China. Finding future steps to achieve the ways and means for China to fully participate in the policing of the sea lanes with the major powers of the world will be a crucial challenge in the years ahead.

China should build on the expertise and experience it has acquired through

interacting with the rest of the world during the past three decades of reform to enhance its capacity in dealing with the strategic difficulties. Confidence building with the major powers in the Pacific, particularly the United States and Japan, is the desired option to pursue. U.S. interference of Chinese cooperation with Gulf nations in the energy industry will likely endure for a long time. But, investment by Chinese companies under the 'go out' strategy and the simultaneous development of Gulf countries' interests in the Chinese oil industry would be a natural and mutually beneficial economic relationship that provides a strong basis for healthy interdependence. At the same time, China's interests in the Gulf region hold no fundamental contradiction to the economic relationship between China and the United States. Therefore, the essence of China's task ahead is how it can participate in the multinational cooperative mechanisms for international crude oil supply under U.S. dominance.

Notes

[1] Zeng Xianzhang, Zhou Rundong, Sun Zhifang, *General History of China's Petroleum Industry*, Vol. 3, Beijing: China Petrochemical Press, 2003, p. 56.
[2] Chen Qingtai, Feng Fei, Zhou Fengqi, Wang Qingyi, "Rudimentary Concept of Chinese Energy Strategy," *people.com.cn*, Nov. 16, 2003. See: http://www.people.com.cn/GB/jingji/1045/2191153html.
[3] Tian Chunrong, "Analysis of China's Oil Imports and Exports in 2005," *International Petroleum Economics*, Mar. 2006, p. 4.
[4] Wang Huaihai, "Analysis of Chinese Energy Structure and Resource Utilization Efficiency," *China Information*, Apr. 21, 2006.
[5] Wang Haiming, "Coal Mine Disasters in 2005," *Caijing Magazine*, December 2005.
[6] For an overview and updates on China's coal mine safety issues, visit the official website of China's State Administration of Coal Mine Safety. See: http://www.chinasafety.gov.cn/.
[7] Susan Jakes, "Beijing's SARS Attack," *Time*, Apr. 8, 2003.
[8] "Advice to Constitute the 'Eleventh Five-year Plan' by Chinese Central Government," *xinhuanet.com,* Oct. 18, 2005. See: http://news.xinhuanet.com/politics/2005-10/18/content_3640318_1.htm.
[9] The point comes from the author's conversation with a frequent participant in China's national energy strategy discussions in April 2006.
[10] "Communiqué of the Fifth Plenary Session of the Sixteenth Central Committee of the CCP," *Xinhuanet.com*, Oct. 11, 2005. See: http://news.xinhuanet.com/politics/2005-10/11/content_3606215.htm.

[11] Zhu Jianhong, "Thanks to Energy Conservation, China's Degree of Dependence on Importation of Crude Oil Decreased in 2005," *China Daily*, Jan. 14, 2006.
[12] Sun Dongsheng, "Grand Transition for China's Economic Strategy: The outline for the formation of San Xian construction strategy," *Party Literature*, 1995, No.3, p. 42-48.
[13] Wu Ruolei, "Sino- Burma Oil Pipeline Project Revealed: Steer clear of Malacca to enhance security," *World News Journal*, Oct.27, 2005.
[14] Yu Sheng, "China Guard the Three Gorges Dam by a Four-Word Knack: Defending, interception, reinforcement and precaution," and Lin Jian, "China Adopts Three Measures to Safeguard Nuclear Power Plants in Case that Cross-Strait War Breaks Out," *International Herald Leader,* Jun. 17, 2004.
[15] Keith Bradsher, "China Sets its First Fuel-Economy Rules," *New York Times*, Sept. 23, 2004, p. W1.
[16] Zha Daojiong, "China's Energy Security and its International Relations," paper presented to the Third IISS Global Strategic Review, Geneva, Sept. 16-18, 2005, p.7.
[17] Toshi Yoshihara and Richard Sokolsky, "The United States and China in the Persian Gulf: Challenges and opportunities," *The Fletcher Forum of World Affairs*, Winter/Spring 2002, pp. 69-75.
[18] Borzou Daragahi, "China Goes Beyond Oil in Forging Ties to Persian Gulf," *New York Times*, Jan. 13, 2005, p. C8, and Howard French, "China in Africa: All trade, with no political baggage," *New York Times*, Aug. 8, 2004, p. 1
[19] Zha Daojiong, "China's Energy Security and its International Relations," paper presented to the *Third IISS Global Strategic Review*, Geneva, Sept. 16-18, 2005.
[20] Chen Ting, "A Contention Among three: The inside story of U.S. dissuading Sinopec to bid Iran oil field," *21st Century Economics Report*, Feb.2, 2004.
[21] Zhang Wenmu, "China's Energy Security and Policy Choices," *World Economics and Politics*, 2003, No. 5, p. 16.

Sea Power and China's Strategic Choices

Zhang Wenmu

No Turning Back

China's national goals have shifted from the need to guarantee its survival during the country's revolutionary days to the current state of securing stable economic development. This shift marks a full transition for China, changing from a closed country to a developing one that is irrevocably integrated with the rest of the world. Today, while this subject is a common discourse in scholarly and political circles, the international community is still coming to grips with the meaning and impact of China's evolving role on the world stage. It is not an easy issue and extends beyond economics.

With external trade accounting for almost 50 percent of China's economy, China is now highly interdependent with a globalized market.[1] This shift also includes hard social, political and geopolitical choices that deeply impact matters of national security. The more developed China becomes the greater its dependence grows not only on foreign trade but also on the resources to fuel the economy. With these complex and expanding interests, risks to China's well-being has not lessened but has actually increased, making China's national security at once both stronger and more vulnerable.

Zhang Wenmu *is a professor in the Centre for Strategic Studies at the Beijing University of Aeronautics &Astronautics. His research focuses on the study of national security strategy. He is the author of some academic books including* China's Security Strategy in the New Century *and* Analysis of the China's National Security Interests in World Geopolitics.

China Security, Summer 2006, pp.17 - 31
©2006 by the World Security Institute

The year 2004 marked the inauguration of the Chinese government's national development goal of "building a balanced, well-off society". With sustained high economic growth rates, China holds great potential to fulfill this grand aim for its population of 1.3 billion people. Achieving this goal would also raise China's status as a player on the international stage. But these national objectives have also locked China into a development path from which there is no turning back. China must continue to move forward, for if it does not, the economy's productive force could turn into a destructive one that leads to chaos and even violent civil unrest. Maintaining China's economic juggernaut not only requires continuing participation in the global market but it also depends on access to energy and other resources.[2]

How can sufficient resources be guaranteed to satisfy China's rapid and stable economic growth? Addressing this question holds immense challenges both for China and the international community.

Equal Rights

A stable energy supply is the key driving force for China's secure long-term economic growth. But China is not achieving that due to a number of important structural contradictions in its energy consumption pattern. A sustainable development model should be one where productivity rises as resource consumption falls. Currently, however, China's productivity is rising while resources are being consumed even faster. China cannot maintain an economy whose energy intensity continues to increase. Such a state of affairs invariably leads to significant ecological degradation. If the cost of restoring the damage to the environment offsets the gains in GDP growth, what has China gained? This is not a healthy way to economically develop. It may be tolerable in the short-term but cannot be viable in the long-term.

The second and closely related contradiction is that while China's hunger for resources increases, its access to resources outside its own borders has not grown in tandem. The West praises the Chinese for being a hardworking people, contributing hugely to the global economic growth. In 2003, China accounted for just 3.89 percent of the global GDP but it contributed to 15 percent of the GDP growth of the world.[3] Yet, an industrious society also requires more food. It is almost as if China is expected to work harder on less sustenance. China makes contributions to the world but does not receive an equal share of its resources. This is not congruent with the international

democratic principle of reciprocity between rights and responsibilities. China will not always have sufficient natural resources to sustain its present participation in the world economy.[4] Equally sharing in the global resources is the international democratic right to which China is entitled.

On balance, China is presently consuming its own resources in its role as the "factory of the world". Resource shortages are rapidly becoming a bottleneck to China's development. The only way out of this predicament is for China to go to the world and rightfully claim its share of international resources.

China will not always have sufficient natural resources to sustain its present participation in the world economy.

This is particularly true of China's need for energy resources. Yet, the irrational distribution of energy is forcibly maintained under the present international order, which is marked by war and conflict. Prior to World War II, the world's center of energy demand and consumption was in Europe and the United States. However, following the oil crises of the 1970s and 1980s, the base of industrial power began to shift toward Asian countries, especially Northeast Asia. Now this region claims the highest demand for oil, though it has critically insufficient oil reserves available for consumption.

However, China currently does not possess the ability to safeguard its equal right to energy in the world. Some say that as long as one has money, resources can always be bought. But, this neglects the reality that wealth and access to resources go hand-in-hand with politics and military affairs.

Security Lags Behind Dependency

The confluence of geopolitics and resource politics has become a basic feature of the international system. The degree of resource shortage worldwide is proportional to the level of tension between big powers. Where there is a scarcity of resources, geopolitics is at play. The latter has a direct bearing on China's survival and development since the country's oil consumption is almost 50 percent reliant on imports. China's dependence on international energy imports is rapidly changing from a relationship of relative dependence to one of absolute dependence. China cannot have control over development goals without corresponding control over the resources to fuel the economy.

The simple fact is that China does not possess that control. More than half

of U.S. oil imports are shipped via the sea lanes.[5] The crucial difference is that China is almost helpless to protect its overseas oil import routes. This is an Achilles heel to contemporary China, as it has forced China to entrust its fate (stable markets and access to resources) to others. Therefore, it is imperative that China, as a nation, pay attention to its maritime security and the means to defend its interests through sea power (a critical capability in which China currently lags behind).

Some observers note that China's overseas trade is presently developing smoothly and there is no need for sea power. However, the question is whether this can be considered development with any guarantee. If one day, another nation(s) finds an excuse to embargo China, what can China do? Any substantial blockage of its foreign trade-dependent economy and/or its energy supply could gravely imperil China.

The history of capitalism and its spread globally have shown that it is often accompanied by cruel competition between nation states. Those countries that lose out are not necessarily economically or technologically underdeveloped or those with a low level of culture. Rather, they are most often those nations who forgo the need to apply their national strength to national defense and therefore do not possess sufficient strategic capability.

Wealth itself does not naturally endow a nation with ample security. Before the Industrial Revolution, the British were far poorer than the Chinese.[6] In terms of GNP alone, China accounted for 32.4 percent of the world's total in 1820, some 1.2 times greater than all of Europe. Yet, in 1840, only 20 years later, China was roundly defeated by Britain. Again, in 1890, although China had 5.3 times the GNP of Japan, China did not prevail in the Sino-Japanese war just five years later.[7]

Independent of wealth, a guarantee of access to global trade and resources necessarily requires sufficient power to defend one's interest in the trade and resource transportation sea routes. Economic globalization entails globalization of the military means for self-defense, because the national defense must go where a nation's economic interests lie.

Protecting Border Security and Security Boundary

In international politics, the idea of security naturally expands alongside national interests, not merely its geography. The security of one's sovereign

territory and a notion of greater national security (interests not necessarily within a country's physical territory) are related, but fundamentally different. They can easily be confused and should be thought of as a country's "border security" versus its "security boundary".

In the past, China's national security was largely confined to border security because it did not have many global interests. Rather, China's core concern was one of survival. With this overriding goal, protecting the homeland and winning a war depended on luring the enemy into the hinterland. This was a viable strategy when China had little inside its border to lose. Today, even if national security were similarly confined to China's territory, such a strategy would be impossible as the whole eastern region of China is the engine of the national economy. Luring the enemy into China would invariably mean the destruction of China's prosperous eastern seaboard and the core of its economic power. Thus, safeguarding China's territorial borders requires a broader concept of security.

Safeguarding China's territorial borders requires a broader concept of security.

Today, China's core national security not only narrowly centers on survival but includes a broader development goal which extends beyond the nation's territory. Indeed, China's national interests – writ large – are especially relevant to the nation's economic development, and may not only involve all the regions of the world but could even include outer space. This gives rise to the concept of a nation's "security boundary", which is a nation's security concerns over all of its national interests, including those beyond its own borders. Many of China's political and economic interests have been widely integrated into the world and therefore its security boundary is much more broadly defined than its border security.

Often, the extension of a country's security boundary is equated to the expansion of its territorial border, thereby creating a threat. In fact, this is incorrect. All countries that enter the global market economy have interests outside the scope of its territorial border. Once a nation state takes part in globalization, it has the right to protect those national interests that have been integrated into the world. The territorial borders of the United States, even in an expansive sense, are only limited to North America. Yet, because of its powerful political, economic and military strength, America's national

security boundary covers virtually the whole globe. China has a territorial border roughly the same in size as that of the United States. However, the security boundary China is capable of protecting does not reach beyond its own territory and is far more limited than the United States due to a deficient military capability overseas.

A security boundary is the boundary of one's interests. Wherever China's interests lead, there too must follow China's capabilities to protect those interests. And as the nation's economic interests expand into the global market, China must consider the problem of safeguarding its global and regional interests. The most crucial conduit connecting China with the region and with the rest of the world is the sea lanes, and therefore, China must have a powerful navy. The oil imports that China consumes from Africa, the Middle East and Central Asia will mainly pass through these sea lanes. China's trade is also 90 percent dependent on sea lane transport. If all goes well and other nations behave fairly, China will certainly act in accordance with WTO rules. But what if others don't act so fairly? It is not difficult for the West to find a pretext to impose sanctions on China. The Yinhe incident in 1993 is a classic case of how the United States has attempted to make an issue out of nothing.[8] Precisely because China's navy did not have the capability to resist, China had little choice but to let them board the ship to make the so-called inspections. In an era when development is the core national interest, China would secure nothing if it did not have a strong navy.

The rise and fall of a country ultimately depends on a country's ability to use national forces to achieve political goals.

The determining factor shaping the rise and fall of a country ultimately is not just the size of its total economic volume but also the strategic ability of the country; that is, the ability to use national forces to achieve political goals. Many cases in history have shown that the main reason for a country to be strong is more than a rise in prosperity or technological advancement but the effective application of such technology and wealth in national politics, especially military power.

The benefits of attaining such capabilities are often not apparent in the short term. The immediate costs of unifying the country during the American Civil War were very dear in blood and treasure. In the long term, however,

Lincoln laid a foundation for the United States that has made it the great nation it is today. When Mao Zedong decided to build an atomic bomb, the sacrifice made at a number of levels in order to successfully complete such a project was enormous for China at the time. In the long term, however, China obtained over 30 years of peace and security to develop as a nation. It is imperative to view the significance of economic growth and technological progress from a political angle. If national economic force cannot be effectively turned into national political force, it will lose its positive significance.

In the current era, where maritime transportation is a key factor to success of the flow of goods and commodities for the globalized economy, a powerful navy able to effectively control the sea passages will receive increasingly greater attention by all nations, particularly China. Thus, a necessary question to answer is how should China seek to protect its own growing security interests regarding these vital sea lanes?

Unifying Sea Rights and Sea Power

Sea power has determined the fate of nations. China is no exception. In the past, China's slow but sure descent into a divided, colonized state at the hands of foreign powers was – to a considerable extent – due to its failure as a naval power. The two Opium Wars in 1840 and 1854 respectively, as well as the Sino-Japanese War of 1895, are examples showing China's crucial defeats at sea, which ultimately led to its failure as a state. The delay of resolving the Taiwan issue is also largely because of China's insufficient sea power.

Opinions in China are greatly divided on whether or not, and if so, how China should strive for sea power. Given both the nature of global interdependence and the disastrous naval defeats of certain countries in history, some have put forward that it is unnecessary for China to emphasize sea power in the process of economic development. Others have stressed the importance of vastly strengthening China's navy in order to vie with other naval powers for hegemony. However, both views are inaccurate. China's sea power is uniquely defined. A traditional Western notion of sea power is the ability to control the sea, while China's concept of sea power is a marriage of the notion of equal sea rights and sea power. In the latter, the application of power on the seas cannot exceed the former but rather should serve the aim and scope of a nation's sea rights.

If "sea right" is the natural extension of the concept of "national sovereignty", then "sea power" is limited to the means to preserving a nation's interests at sea. Two points are worth noting here. First, in a fundamentally anarchic international political system, sea rights are often exercised through sea power and therefore people unconsciously confuse the two. Naturally, these ideas are linked, but they are really two completely different concepts. Sea power is only the means to achieve sea right, not sea right itself.[9] Second, a nation's sea power is also an important medium to transform sea rights into sea hegemony. Hegemony is the act of one country manipulating and controlling others' behavior by dint of its strength.[10] Such influence or domination is separate from a fair and lawful sea right, which any country naturally possesses.

A sea right is a national right that only sovereign states are entitled to and can exercise according to international law. Sea power is in fact a neutral concept though it has come to mean a capability at sea through which one can compel others by force. In the international community, only the United Nations or countries and bodies authorized by the United Nations are qualified to use such force.[11]

Control over the sea may hold the balance regarding the survival of a nation. While this statement may sound arbitrary, it undoubtedly conveys the fate of some great powers in the past, for example, when the United States became independent in the late 18th century the young nation regarded strength on the sea as its lifeblood. India is perhaps the most vivid example of the importance of sea power. The Indian Ocean is at the center of the world geopolitical system and India is the primary power in its orbit. Over a period of several centuries, the Indian Ocean was first controlled by Iberian countries and then by the British Empire, which forced India to become a British colony due to its failed sea power. This humiliating course of history impelled India's first Prime Minister, Jawaharlal Nehru, to articulate that India, constituted as she is, cannot play a secondary role in the world. She will either count for a great deal or not count at all. A middle position is not an option for India.[12] Some ascribe a hegemonic tendency to these thoughts but they are in fact, no more than a deep concern of India's unique position in a

China's concept of sea power is a marriage of the notion of equal sea rights and sea power.

geostrategic location. If India cannot establish an effective national security shield in this geopolitically central zone, namely the Indian Ocean, then it will never have a secure future.[13]

Is China in the same boat? Is there a particular geostrategic water mass that China must control or face the prospect of being controlled? What are the limits of that strategic goal? What are the contents and scope of China's sea rights?

The Limits of Sea Power

In the near to medium term, unifying Taiwan with the motherland and recovering China's sovereign islands is both the great historical mission that the Chinese government must shoulder and a necessary foundation for China to safeguard its national sea rights. Therefore, within the context of these imperatives, the significance of China expanding its naval power can never be overestimated. Whether these goals are realized peacefully or otherwise, the Chinese navy's future military role in unifying the country will be of great importance. In this sense, and only within the scope of national sovereignty, the expansion of China's sea power is unlimited.

The Taiwan issue not only involves the issue of China's sovereignty; over the long run, it is also very relevant to the problem of gaining sea power which will determine the fate of China's development. If China loses Taiwan, it will subsequently also lose the Nansha Islands (Spratleys) and perhaps the Diaoyu Islands. Losing these regions implies that China will lack the basic space for ensuring national political and economic security that will be essential to China's rise as a great power. That is because the center of gravity of China's national economy has shifted to the southeastern region, whose economy is spearheading China's great development drive. Given this, China's security boundary cannot be limited to its southeastern coast. If Taiwan and other islands are not within China's control, China will not be able to guarantee the border security of commercial centers such as Shanghai, Guangzhou and Shenzhen.

Beyond the above objective however, China's sea power and the expansion of its navy are limited. This is because many issues relevant to international maritime rights need to be resolved through multilateral consultations within the framework of international laws of the sea. The goal of the Chinese navy

in this environment is merely to ensure the lawful execution of multi-party discussion outcomes. From this perspective, China's sea power is fundamentally peaceful and Chinese naval build-up is confined to the role of providing self-defense and deterrence. The goal of a strong Chinese navy will always be to afford China the ability to independently stand up for its rights in the world on an equal footing with others.

Know Thy Self

This paper has discussed the nature of China's irreversible joining of the global system, China's right and necessity to protect its evolving interests in that system and the limitations of those goals. This has caused a varying degree of anxiety amongst certain nations regionally and globally. Thus it is important to address how China envisions its position in the world, and how China will wield its growing power and influence.

Profoundly relevant to this issue are the lessons from history that China has garnered and internalized. History shows that the rise and fall of great powers principally depends on how they exercised national power and influence outside their sovereign borders. The demise of all such powers in history has resulted from their succumbing to the temptation of excessive expansion. When one considers China's need for world resources, its growing national strength and the need for a strong navy to protect its interests, does this not mean that China's military capabilities will also expand out of control in the future?

Absolutely not! If China's modernization drive entails worldwide expansion, even unwarranted regional expansion, it will be the nation's road to disaster. In fact, the 50-year development goal that Deng Xiaoping set out for China's future was to become a "medium-developed" country. In this way, he has positioned China as a regional power for the foreseeable future. China's influence in the world is essentially realized through a regional framework. In this way, China is fundamentally different from the United States, whose outlook in terms of power and influence is organically global in nature.

One way such differences are manifested is by the culture and character of each country's respective defense establishment. For instance, U.S. military exercises always take on some major country in the world and face an imagined opponent on a battlefield in a foreign land such as the Red Sea,

the Panama Canal, the South China Sea or Okinawa. Chinese soldiers, on the other hand, traditionally view their role as protecting the homeland and envision the battleground as Shanhaiguan, Wuhan or the Yangtze River. In fact, the American experience may have taught China that its military should indeed have a greater outward orientation. Furthermore, China's future security policies need to change from the policy of defending the home territory to the policy of maintaining what China has already accomplished regionally; from an inward-looking policy of keeping to its own affairs to a policy of outward active defense. However, China should of course concentrate on Asia, maintaining friendly relations with its neighbors, and thus laying a meaningful foundation for its long-term future.

> The demise of all major powers in history has resulted from their succumbing to the temptation of excessive expansion.

Beyond this, any further ambitions are curbed by the profound lessons China has taken from the events such as the fall of Germany in the last century and the current U.S. predicament in Iraq.

The Crucial Lessons of History

The study of German history and the great success of Otto von Bismarck alongside the failure of Wilhelm II are especially instructional. Bismarck saw an opportunity to unite the German provinces using dynastic wars and a complex system of regional and international cross alliances. His brilliance however, lies less in the accomplishment of unifying the German Empire, than in his understanding that Germany had to limit its own ambitions to regional power and influence, despite its ascendancy at the time. Bismarck was not only able to deter France and others from destroying the newly unified Germany, but he was able to maintain a relative stability in Europe by imposing a self-restraint on Germany's ambitions beyond its borders and the region.[14]

Bismarck's foreign policy of strategic self-control led to a rapid rise in Germany's national strength, a state of affairs that dramatically changed after he stepped down as chancellor in 1890 in favor of Wilhelm II. The new emperor reversed Bismarck's foreign policy and unwisely yielded to Germany's

impulse for worldwide expansion driven by the rise of its national strength and pride. Certainly the fortunes of Germany go beyond the actions of two single leaders, nevertheless the latter period introduced the large scale expansion of German nationalism and its military might regionally and further abroad.[15] These adventures increased direct confrontation with other powers in the world, including France, Russia, the United States and Britain. Treaties to confine Germany's growing ambitions were formed between almost all of the major powers. The rest is history as Germany was defeated and nearly destroyed as a nation through the two World Wars.

Any country must grasp a delicate balance of pursuing its interests and avoid overdrawing its national strength in great power competition.

These historical experiences on the European continent are apropos of China's future. The essence of Bismarck's foreign policy is to not fear challenges to one's national sovereignty and be bold in resorting to force if necessary. Beyond that, however, involvement in international issues is complex and fraught with grave risks. Any country must grasp a delicate balance of pursuing its interests and avoid overdrawing its national strength in great-power competition. In short, China will seek regional influence not global domination because this is in China's own interest and a matter of survival.

The more recent history of the United States is also a poignant lesson for China. After joining the ranks of world powers in the middle of the 20th Century, the United States has begun to witness the decline of its national fortune, which is closely related to its policy of pursuing world hegemony.

America's superior economic strength came into ascendancy following World War II and has slowly evolved into a global expansion of its military might, especially sea power. This process began with control of the Pacific Ocean when the U.S. Joint Chiefs of Staff drew up a westward "frontier" migration plan in 1946. According to the plan, the 7th Fleet of the U.S. Navy entered Japan and occupied the Ryukyu and Ogasawara Islands. With Asia's largest navy based in Okinawa, the United States continued by occupying the Mariana, Caroline and Marshall Islands in 1947. However, this expansion met with serious setbacks in the Korean Peninsula and Indochina.[16] In the 1950s, the United States suffered heavy losses in Korea when fighting with China. In the mid-1960s, after France withdrew from Vietnam, the United States hast-

ily entered Indochina to shoulder the burden of "salvaging the democratic world". The result was the quagmire known as the Vietnam War.

It was during this period that America's world expansion began to consume its national strength. In 1960, the United States accounted for 25.9 percent of the world's total output value but dropped to 23 percent in 1970 and 21.5 percent in 1980. Meanwhile, countries like Japan witnessed a quick rise in their share of the world's total output. Its share rose from 4.5 percent to 9.0 percent of the world's total between 1960 and 1980, while China's increased to 4.5 percent from 3.1 percent over the same period. Nixon saw the drop in U.S. national strength as a result of overseas expansion and decisively altered U.S. foreign policy by ending the Vietnam War and normalizing relations with China. U.S. national strength began to rise once again until the end of the Cold War. Although its arch enemy, the Soviet Union fell apart, the United States resumed its expansionist foreign policy. Through the first Gulf War in 1991, the Kosovo War in 1999, the Afghanistan War in 2001 and its present occupation of Iraq, the United States has installed its military forces into the Gulf Region, the Balkan Peninsula and Central Asia, fully displacing the geopolitical ambit of the Soviet Union. Moreover, the United States withdrew from the Anti-Ballistic Missile Treaty in 2002, permanently altering the global strategic balance.[17]

Under the present administration of George W. Bush, the United States has clearly become the international hegemon. America has not learned the painful lessons of the past. This is abundantly clear as America becomes increasingly bogged down in its Iraq campaign. It is also true in its treatment of China. The dynamic between China and the United States today is closely reminiscent of the 19th century, when Britain attempted to keep a young America under control. Those painful memories of struggling to find its place under British domination have been forgotten. As China grows out of its isolation and attains greater influence internationally, there is a very real risk that the United States will repeat the mistakes of past great powers, and try to contain China. How relations between China and the United States in this context will play out is of critical importance in the near and medium future.

Perhaps a greater lesson for China is how it will make its own choices as it rises in power and influence. The history of past empires shows us that no great power has been able to resist the temptation of worldwide expansion to the point of overstretch. Yet, a country can only remain strong if it restrains

its ambitions to a regional scale. China's great challenge is to resist the course that the United States has chosen, since worldwide expansion will inexorably lead to a nation's demise. No matter how strong China becomes in the future, it should always adhere to the basic foreign policy precepts set out by the late Chairman Mao, "dig deep holes, store abundant grain and never become a hegemon."

Notes

[1] "The Chinese economy is highly dependent on foreign trade should be swiftly addressed," *Oriental Morning Post*, Dec. 8, 2005. See: http://finance.people.com.cn/GB/1045/3925435.html.

[2] National Development and Reform Commission, "China to become the second largest energy consumer in the world," Nov. 4, 2004. See: http://news.xinhuanet.com/zhengfu/2004-11/04/content_2175691.htm.

[3] "China contributes 15 percent of the GDP growth of the world," *China Business Times*, Sept. 20, 2004. See: http://news.sohu.com/20040920/n222124515.shtml.

[4] Zhu Chuan, *Mineral Resources and Sustainable Development*, China Science and Technology Publish House, 1999, p. 41.

[5] Energy Information Administration, "Country Analysis Briefs: United States," Nov. 2005. See: http://www.eia.doe.gov/emeu/cabs/Usa/Full.html.

[6] Angrus Madison, *Chinese Economic Long Run Performance,* translated (*Zhongguo Jingji De Changyuan Weilai)* by Chu Xuping and Wu Xiangsong, Xinhua Publishing House, 1999, p. 57.

[7] Ibid.

[8] Zheng Fei, "The U.S. detains China's Yinhe shipping vessel to remain on high seas for 33 days," *Beijing Legal Times*, Sept. 25, 2004. See: http://news.tom.com/1002/2004925-1358206.html.

[9] Power, written as 'pouer' in English in the medieval times, originated from the ancient French 'poeir,' and meant the ability to do something. Later, it was extended to: a nation, esp. one having influence or domination over other nations. See: *Webster's Dictionary* (2nd college ed.), p. 1116.

[10] Hegemony: leadership or domination, esp. that of one state or nation over others. See: *Webster's Dictionary* (2nd college ed.), p. 649.

[11] The General Navy Dictionary contains no entry on "sea right" but has explanations about "sea power theory" and "sea strength theory". This author thinks that the latter explanation is a more accurate translation of sea power. See Zhang Xuhan (ed.), The *General Navy Dictionary*, Shanghai Dictionary Publishing House, 1993 ed., p. 7.

[12] Jawaharlal Nehru, *The Discovery of India*, Teen Murti House, 1999, p.56.

[13] India's unease is described by K. M. Panikkar, India's first ambassador to China and the founder of India's modern sea power theory. See: K. M. Panikkar, *India and the India Ocean – an Essay on the Influence of Sea Power on Indian History*, translated by De Long et al, World Knowledge Press, 1965 ed., pp. 88-81.
[14] Dittmer Ralf, *A History of Germany, Chinese ed.*, Inter Nationes Press, Bonn, 1985.
[15] Paul Kennedy, *The Rise and Fall of the Great Powers*, translated by Wang Baocun et al, Seeking Truth From Fact Press, 1988 ed., p. 247.
[16] Ibid pp. 532-533.
[17] Zbigniew Brzezinski, *The Grand Chessboard: American and its Geostrategic Imperatives*, translated by the China Institute of International Studies, Shanghai People's Publishing House, 1998 ed., p. 4.

The Oil Weapon: Myth of China's Vulnerability

Bruce Blair, Chen Yali, and Eric Hagt

The Sword of Damocles

The geopolitical canvass on which China plots its strategy for energy security displays a ubiquitous presence of one country: the United States. Chinese energy security planners must reckon with America's ravenous consumption of imported oil, its strategic alliances with other heavy importers of oil in Asia, its overseas military operations in the heart of the world's leading oil producing region, its naval dominion over the world's oil transportation routes, and the global domination of U.S. oil companies or multinational oil companies heavily capitalized by American investment. This is the context in which China pursues its energy security, sometimes blandly described as 'conservation and diversification of supply', which masks the nation's real struggle to satisfy its rapidly growing energy needs without exposing its energy lifelines to external forces that may, intentionally or not, betray China's interests.

Chinese planners view oil as a strategic political commodity that requires a national plan to ensure its reliable flow from abroad, and cringe at the thought of surrendering its provision to foreign control of any stripe. Whether this is foreign business interests driven by the profit motive, the vagaries of the 'invisible hand' marketplace, unaccountable and faceless transnational decision-makers, American foreign policy pressure, or U.S. naval warships, China's

Bruce G. Blair *is the president of the World Security Institute in Washington, D.C.* ***Chen Yali*** *is the editor-in-chief of* Washington Observer *and* ***Eric Hagt*** *is the director of the China Program at the World Security Institute.*

China Security, Summer 2006, pp.32 - 63
©2006 by the World Security Institute

anxiety is magnified by its perception, real and imagined, that it lacks control over market and strategic factors in times of emergency.

China's main vulnerability stems from its fast-growing dependence on Middle Eastern oil. China's surging imports, rising from zero net imports in 1993 to 2 million barrels a day now to 8 million barrels daily in 2020 (roughly the same amount as all of Saudi Arabia's current daily export), will inevitably elevate the Middle East to the top of China's supply chain. For all the controversial inroads China has been making into far-flung oil fields in regions like South America, and the deals it may strike with neighboring producers like Russia, China will depend on the Middle East for the vast bulk of its growing oil imports for the foreseeable future.

This reality means that China is becoming entwined in the complex geopolitics of the region and, for better or worse, is becoming hostage to U.S. oil diplomacy. On the positive side of the ledger, that diplomacy actually reduces China's vulnerability to the extent that it accomplishes its primary aim – maintaining the reliable flow of oil to the world market at moderate prices. This aim requires the United States to militarily defend the energy infrastructure of the Middle East and to keep an economics-minded, responsible Saudi regime in control of OPEC pricing. To this end the United States has spent over $1 trillion over the past two decades, and China has reaped a huge benefit at little cost to itself. The U.S. intervention that drove Saddam Hussein out of Kuwait, for instance, restored oil stability to the region and led to a decade of low oil prices, a benefit enjoyed by China during its economic take-off in the 1990s.

The United States has spent over $1 trillion over the past two decades defending the global energy infrastructure.

On the negative side, the latest assertive intervention by the United States into the Middle East has destabilized the region. This turmoil coupled with increasing weakness in the so-called fundamentals of the global oil market – declining investment in global exploration and production resulting in a shrinking oil reserve base, accelerating demand caused by the growing U.S., Chinese, Indian, and other economies, and cyclical stagnation of production capacity of non-OPEC suppliers – has spurred a steady rise in "oil security premiums", a kind of "fear surcharge" tacked onto the "normal" price of a barrel of crude. The price of crude has sky-rocketed on the back of this

surcharge. Although most credible projections portray the future world oil picture over the next 20 years as one of sufficient supply to meet growing demand, the "fear premium" now seems to be locked into the psyche of oil futures dealers, and the price of oil seems to be increasingly inelastic as a result – developed and developing nations alike cannot seem to slake their thirst for this liquid gold regardless of its cost.

China's Quest for Energy Security

Mounting oil anxiety is playing on China's historically deep-seated psychological commitment to energy self-reliance, leading China to press harder its claims on resource-rich but disputed territories such as the East China Sea, pitting it against a number of equally oil-hungry nations. Many of these neighboring nations vying with China for bigger slices of the resource pie also harbor bitterness and suspicion toward one another based on historical grievances. This simmering hostility beneath the surface coupled with the fact that many of them such as Japan are staunch allies of the United States furthers the Chinese perception that the United States could threaten its energy security.

China's mindset of self-reliance accommodates its growing dependency on imported oil by searching exhaustively for exclusive bilateral deals with producers and suppliers around the globe, including U.S.-designated "pariah oil states" such as Iran, Sudan, Cuba and Venezuela. China's "nationalistic" diversification of its supplies through exclusive relationships with any and all oil-rich nations willing to deal has been widely reproached, including criticism that the practice distorts the global open market for oil. In reality, however, the means of production in the oil sector are predominantly controlled by governments, not the marketplace (which does regulate the oil futures and spot markets). In economic terms, furthermore, the so-called "equity oil" deals in theory do not reduce the global supply of oil or raise its price. On the contrary, it tends to boost investment in the oil sector overall and thus contribute in a positive way to increasing production and lowering prices. In practice, China's stiff competition for upstream oil deals does work to bid up the price of an increasingly scarce commodity. China's investment forays are also driven less by sound financial risk assessment than by foreign policy interests, and hence in economic terms they fall short of rigorous business practices.

In any case these Chinese investment forays in often faraway lands do not really promise China any real energy security. They will produce too little oil too slowly to offset China's rapidly growing imports, and most of the oil will not even enter China at all. Transportation costs will be so high that the oil generally will be sold or swapped for other oil that will enter China.[1]

These upstream deals and any successful claims on disputed oil sources will by no stretch of the imagination relieve China of its dependency on Middle Eastern oil. The die is cast for China to increase that dependency, and by implication to yield significant control of its energy future to regional forces beyond its control, including powerful forces associated with the U.S. government, military, and big oil interests. China thus has cause to worry that the pervasive instability in the region could lead to severe disruption of supply and to further sharp increases in the global price of oil.

In this environment, China's fears of energy insecurity peak with the specter of Sino-American tension and conflict leading to a disruption in its oil imports, the most extreme form of which would be a U.S. blockade of China's oil imports from the Middle East. Fear of such a worst-case scenario has the potential to negatively influence the direction of China's policies in pursuit of energy resources around the globe and its measures and means of protecting those interests. Some analysts, in both China and the United States have suggested that such fears may warrant (and trigger) a rapid naval build up by China.[2] Others see these emerging trends as driving China's efforts to reshape regional relations to its strategic advantage, and even to the exclusion of the United States.[3] Neither outcome would stabilize the security environment in the region nor be in the interest of the United States. Therefore, it is crucial to assess both the plausibility of such a blockade and its potential effects on China's economy if it were to occur.

China's fears of energy insecurity peak with the specter of Sino-American tension and conflict leading to a U.S. blockade of China's oil imports from the Middle East.

In the analysis that follows, two essential points are brought to light. The first examines the background and justification for China's fears of a U.S. embargo or blockade. Unfortunately, China's anxiety over the possibility of such an incident occurring is not entirely misplaced. Despite a cause for concern,

this paper also shows the unlikelihood of an American blockade on China's oil imports from the Middle East. These conclusions are based both on positive and negative factors. On the bright side, the nature of the international energy markets makes such a scenario highly improbable and very problematic to execute effectively. More disturbing, but also making a blockade of any form extremely implausible, is the dangerous reality of China's likely response were it to be attempted.

An American oil embargo, blockade or other severe disruption to China's energy supply may be remote, yet the psychological impact of its very possibility can wreak far more havoc on the nation's sense of security. Much of this anxiety stems from the belief that China's economy cannot tolerate a substantial disruption to its oil supply. The second point of analysis of this paper attempts to debunk that myth. This is illustrated using two of the worst-case scenarios for Chinese energy security. The first assumes that the Saudi regime collapses and the world's largest exporter of oil suddenly stops exporting. Some 9 million barrels of oil daily cease flowing onto the world market. The second scenario features a U.S. military blockade that severely staunches the flow of oil imports from the Middle East into China. China is deprived of over 2 million barrels of oil daily from the Gulf, representing about 60 percent of its normal daily imports, and one-third of its total oil consumption.

Oil Anxiety in Asia

The backdrop of current oil anxiety is the pervasive fear, especially pronounced in Asia, that world oil production cannot keep pace with soaring world demand. Interestingly, the most authoritative projections of world energy supply and demand do not justify this pessimism. On the contrary, mainstream assessments tend to project macro-stability over the next 20 years and beyond. While acknowledging the wide latitude for short-term price volatility and swings in energy demand and supply, the overall long-term outlook is sanguine. As Figure 1 shows, they portray the future world of oil as one of almost perfect balance and harmony between production and consumption.

Oil prices generally remain inside their historical band in constant dollar terms, and supply keeps pace with demand, largely thanks to increasing capacity in the Middle East. The picture is one of general equilibrium in spite of world oil demand increasing inexorably by 2 percent each year. This optimism

may of course be misplaced. Pessimism and anxiety over shrinking reserves ("peak oil" theory) have been spreading through the ranks of oil watchers in recent years. A gloomy fatalism appears to be descending on a widening circle of oil forecasters around the globe.

Whether or not oil production will be technically adequate to meet growing consumption for the indefinite future, the specter of geopolitical upheaval severely disrupting the flow of oil cannot be dismissed. The recent disruptions in Indonesia, Venezuela, and Nigeria were hiccups compared to the havoc that may be wreaked on the oil trade at any time in the Middle East. This epicenter of geopolitical turmoil keeps world energy security at perpetual risk. Arab states declared an oil embargo in 1967 and the OPEC cartel has acted twice in recent history (1973 and 1980) to cut oil production and raise prices. The global repercussion of the price shock in latter instances was a massive

Figure 1 World Oil Production[4]

	History					Projections				
	1990	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total World Oil Production*	66.7	77.0	78.2	79.4	83.0	83.8	94.6	101.8	108.5	120.2
Total World Oil Consumption*	66.1	77.1	78.1	79.6	82.3	84.3	94.6	103.2	111.0	120.5
Total China Oil Production*	2.8	3.3	3.0	3.1	3.1	3.1	3.7	3.6	3.6	3.4
Total China Oil Consumption*	2.3	5.0	5.2	5.5	6.5	7.0	9.2	10.7	12.3	12.8
Total China Oil Import from Persian Gulf *		0.9				2.3		4.0		5.7
Total China Oil Import from Other Sources*		1.1				1.5		1.7		2.9
Total China Energy Consumption (In Quadrillion BTU)	27.0	39.7				43.2	73.1	86.1	97.7	91.0
Total China Energy Intensity (Thousand BTU per US $ of GDP, 2003)	72.5	37.8				31.0	28.4	25.5	22.6	
China GDP (In Billions of US $, 2003)	491.0	1162.0	1263.0	1409.0	1606.0	1758.6	2555.0	3417.0	4446.0	5706.0
Total World Oil Price (2003 US $ per Barrel)	22.0	24.0	24.1	27.7	34.0	35.0	25.0	26.7	28.5	30.3
*Million Barrels per Day										

recession in the industrial world, a history lesson that is not lost on Chinese energy planners. Oil is the most political commodity in the energy basket, and is unique in that only oil has experienced deliberate supply interruptions and price spiking in the international arena. [5] Although OPEC has lost some of its former clout as non-OPEC production has greatly increased in the last two decades, the cartel still wields considerable power over oil supplies and pricing.

China's (and the world's) anxiety about its growing dependence on Middle East oil is especially acute in view of the emergent threats to the stability of oil exports from the region: U.S. military dominance in critical energy hotspots[6], and in China's perception, the resulting American unilateralism that makes it prone to coerce by force, the chronic civil strife in post-war Iraq, the rise of terrorism and sabotage, and the constant danger of violence spilling over from the Arab-Israeli dispute.[7] Many of these threats to the flow of oil exports to China stem directly or indirectly from the vigorous assertion of American primacy and the militarization of U.S. foreign policy in the region (and world).[8] Much of the turmoil in the global energy market that unsettles China is the result of American intervention into the heart of the global oil production system. Chinese security specialists understandably extrapolate this American history to the Asian context, and pose the next logical question: might the United States someday intentionally intervene into the heart of China's oil import network?

The future world of oil as one of almost perfect balance and harmony between production and consumption.

China's Fear of U.S. Oil Manipulation

The U.S. is identified by Chinese analysts as the most important external force impacting China's maritime security interests, which not only include Taiwan, the East China Sea and South China Sea, but also China's sea-lane security.[9] China is casting an especially wary eye at the U.S. role in its energy future, for reasons partly related to the strong bilateral alliance between the United States and China's chief rival in the tightening oil competition – Japan, but mainly related to America's ties with Taiwan. On the Taiwan question, the interests of China and the United States sharply diverge, and China expects the United States to exert oil pressure on China to protect its Taiwan

interests in extreme circumstances. If the history of U.S. oil diplomacy is any indication, the Chinese have cause for concern. The historical record reveals an American proclivity to embrace oil sanctions and blockades in exercising coercive diplomacy.

During the early Cold War years, the United States planned to counter a Soviet invasion of oil kingdoms in the Middle East by blowing up the region's oil wells and facilities.[10] U.S. defense planners even considered a plan to contaminate the oil fields with radioactive materials ("dirty bombs") in order to deny the Soviet Union the petro-wealth and power it would otherwise acquire by occupying the region.[11] The emphasis of its plans has been to deny oil to adversaries to prevent them from getting any stronger, rather than securing the oil for U.S. consumption. Denial and coercion have been the hallmarks of U.S. oil strategy toward adversaries. More recently, the United States exhibited its inclination to staunch the flow of oil during the embargo of Saddam Hussein's oil exports from Iraq, the planned oil blockade of the former Yugoslavia in 1999 during the Balkans conflict, the serious consideration given to imposing an oil embargo on North Korea in 1994, and the tacit threats to block China's importation of oil during a conflict over Taiwan. To some extent China's own experience in applying or suffering oil coercion or manipulation in relations with North Korea, Japan, and Russia magnifies its fear of future U.S. oil pressure.[12] (China shut an oil pipeline to North Korea for a few days in 2003 to express its dissatisfaction with North Korea's nuclear weapons policy.)

China's own experience in applying or suffering oil coercion or manipulation magnifies its fear of future U.S. oil pressure.

Whether exaggerated or not, the specter of the United States coaxing Persian Gulf oil producing states to reduce supplies to China, or even turning back supertankers laden with petroleum enroute to China, is taken very seriously by some Chinese strategic analysts.[13] China's lack of a significant strategic reserve (7 days worth versus Japan's 100-day reserve[14]) magnifies its sense of vulnerability. The various speculated purposes served by strangling China's oil inflow include dissuading China from blockading Taiwan; forcefully reunifying Taiwan with the mainland; containing China's expansion of its regional power; stunting its economic growth; and deterring or retaliating for any and all imaginable acts of Chinese belligerence that endanger vital American interests.

Oil Blockade: U.S. Assumptions

Lending a degree of plausibility to the scenario of a U.S. blockade of China's oil imports from the Persian Gulf is the fact that the U.S. Navy believes it may possess the wherewithal to enforce an ironclad blockade with near impunity. The U.S. Navy operating in the Strait of Malacca, as well as other strategic chokepoints such as the Straits of Hormuz, controls the entire oil delivery route from the Middle East to Asia and could quickly turn off the spigot supplying China. In the opinion of certain U.S. senior naval combatant commanders responsible for the Pacific zone, a blockade against China would not necessarily cause enormous collateral damage to U.S. allies in North East Asia such as Japan.[15] The United States, they believe, could impose a blockade on oil tankers bound for China without constricting oil bound for U.S. allies along the Pacific Rim.[16] It could carry out the maritime intercept operations that had been routinely conducted since 1990 in the Persian Gulf to enforce the embargo on Iraq's oil exports. In such operations a U.S. military helicopter dispatched from a Navy ship lands on the tanker, inspects the cargo papers in the pilot house, and instructs the captain either to proceed or turn back. With armed U.S. naval ships standing by, compliance has been practically universal, except for the occasional North Korean ship that attempted to flee the scene. Such concerns are more than empty speculation. In 1993, the U.S. Navy stopped and inspected a Chinese container ship suspected of transporting "sensitive material" to Iran.[17] It is believed by the U.S. military these same well-honed U.S. naval skills could be applied around the vital oil chokepoints to screen out supertankers heading toward China while allowing passage to those headed for other Pacific Rim destinations.

Despite China's double-digit (13 percent average) defense spending increases over the past 10 years and its impressive military build-up, the United States believes its sword of Damocles hanging over China's energy security will remain in place for many decades to come. While seeking to diversify its sources of oil imports and building overland pipelines to channel more oil into safer routes, China will scarcely reduce its dependency on Middle East oil or its exposure to an oil blockade, and neutralizing the U.S. capability to threaten this lifeline is not becoming any more feasible. China will be tempted, and indeed is already trying to acquire military capabilities to project enough military power over the vital oil sea lanes to counter the U.S. sword. China has been allowed by various nations along the oil sea arteries from

Hormuz to Malacca to establish coastal intelligence and military outposts in order to monitor the routes and support Chinese naval operations aimed at protecting the lifeline, such as escorting China-bound oil tankers.[18] But according to knowledgeable U.S. military experts, China could not prevent the United States from cutting this vital artery.[19] It is orders of magnitude more difficult to protect the sea lines than it is to disrupt them. In their view, there is no realistic prospect that China will acquire the long-range sea control capabilities needed to ensure that oil tankers bound for Chinese ports could run the gauntlet.[20] If such assessments are valid, the United States holds the key to Chinese access to oil from the Middle East.

The United States holds the key to Chinese access to oil from the Middle East.

In addition, under the above analysis, China could not implement an effective counter-blockade with a view to preventing Persian Gulf oil from reaching U.S. allies in the Pacific region. China lacks any ability to enforce a surface embargo, and therefore could not distinguish 'friend from foe', identify the tankers' "nationality" and destinations, and otherwise apply force selectively. China would thus have to resort to indiscriminant attacks on shipping using torpedoes and mines, thereby risking conflict with others in the region and beyond. These attacks would be carried out largely by China's submarine fleet, which would doubtless manage to randomly sink some vessels in the style of German U-boat operations against British ships in World War I. But China would have to declare a complete embargo of Japan, Korea and Taiwan, and risk sinking the ships of any of scores of shipping nations. (China also relies on foreign shipping for more than 90 percent of its sea-based commerce.) Besides the complication of legality under international law, such indiscriminant attacks would not score many hits and the operation could not be sustained very long by the current Chinese submarine force.[21]

China's Response

Gen. Douglas MacArthur's bold claim in 1951 that the United States controls the shores of Asia, has never been forgotten or underestimated by the PLA Navy (PLAN).[22] Neither has this reality of half a century ago been felt more acutely by China than it does today. Chinese analysts clearly recognize

the vulnerability of the nation's oil transportation routes by a U.S.-enforced blockade in the scenario of a conflict over Taiwan.[23] China has offered no official explanation of its position if confronted by such circumstances. However, many Chinese analysts believe that any such blockade would be highly unfeasible because of its dubious legality in international law.[24] Others reject its plausibility on the grounds that regional states, including the littoral Malacca Strait nations, would not cooperate with the United States. However, the unofficial opinions of both Chinese military analysts and energy experts are nearly unanimous in their conclusion that a U.S. blockade of China's oil would be tantamount to war.

In terms of conventional means, China has acquired technological prowess with its intermediate-range surface-to-surface missiles, which are equipped with precision guidance and pose threats to U.S. bases as far away as Japan and Guam. The threat this would pose has been questioned by American military assessments, especially if considered under a fundamental assumption of a limited conflict. Active U.S. and allied missile defenses (surface-to-air defenses) coupled with passive defenses (such as rapid runway repair capabilities) would limit the amount of damage and ensure that U.S. bases returned to operational status in short order. In addition, U.S. military responses could span the full spectrum from attacking similar facilities throughout China to seizing the Chinese islands in the South China Sea. Chinese missile strikes against U.S. bases, especially in Japan, would also likely trigger Japan's full support of the United States in the defense of Taiwan entailing the full participation of Japan's superb air and naval forces in the fight.

> There is no natural firebreak in a conceivable conflict and escalatory updrafts would accompany each move and counter-move, beginning with any oil blockade and possibly ending in nuclear disaster.

While China may not have the capability to selectively counter a blockade by the United States and still contain the conflict, it would certainly possess options to retaliate and escalate the conflagration if it felt pressured to raise the stakes.[25] Because China would lack the naval power to effectively break a blockade, let alone enforce control of its sea lines of communication, retaliation would more likely be the targeting of other areas of transportation freedom against the Unites States.[26] Moreover, the doctrine of PLAN

explained by the former commander of PLAN indicates that China will not only counterattack, but escalate in naval warfare: "When enemies attack our coastlines, we will attack our enemies' home base."[27]

The likelihood of escalation is important because a piecemeal oil blockade is unlikely as China would not conceivably limit its counter-measures if it is on the losing side of such a conflict. Any blockade is more likely to accompany a larger military campaign, in which case a complete obstruction of all shipping would occur naturally as civilian supertankers would stay far away from the zone of conflict after the combat begins. By this stage of the contest, the stakes would become far greater than oil alone. Indiscriminate counter-measures would halt China's own energy imports and its large overseas trade volume, but it would also stop all shipping to the rest of North East Asia, a situation that would plunge the world economy into chaos (Japan would be especially vulnerable as it is over 90 percent dependent on oil imports and approximately 20 percent of its economy is dependent on foreign trade). The potential damage would be so devastating to the global economy it makes for an almost impossibly remote scenario.

An even more dangerous dynamic could easily come into play involving hard-nosed major powers with nuclear weapons in their arsenals. The nature of such a scenario would obviously depend greatly on the cause and conditions of the conflict but there is no natural firebreak in a conceivable conflict and escalatory updrafts would accompany each move and counter-move, beginning with an oil blockade and possibly ending in nuclear disaster.

International Markets: First Line of Defense

China's vulnerability to oil supply disruptions and price shocks obviously depends on the scenario. The circumstances could vary enormously. As recent events have demonstrated, price spikes may result from isolated incidents that carry weighty implications, such as recent terrorist strikes in Saudi Arabia that undermined confidence in the country's political stability. Such events also prove that energy insecurity is as much a psychological as a physical condition. The psychological impact on oil prices is often far greater than any physical consequence. The mere fear of the demise of the Saudi regime leading to supply disruption raised prices. The mere fear that Yukos oil would stop flowing in the midst of its tax dispute with the Kremlin caused a significant oil

spike in the international oil market. These fears translate into an "oil security premium" that has been running as high as $10 to $25 a barrel.[28] Similarly, it is Asia's relatively greater fear of oil supply disruption, a fear rooted in its greater dependency on imports (relative to Europe or North America), that Middle Eastern producers can and do exploit by charging an extra $2 per barrel to Asian customers.

Terrorism or inter-state conflict in the region may of course physically damage key oil facilities and significantly disrupt the production and transportation of oil, resulting in a price hike, as happened during the two Gulf wars. The same applies to terrorist assaults on oil shipping. An oil importer's nightmare is the terrorist sinking of a ship that obstructs a vital chokepoint such as the Malacca or Hormuz straits. The frequency of terrorist attacks on Middle Eastern oil pipelines, facilities, ports, and transportation vessels has increased sharply in recent years. Piracy on the high seas, particularly in the southern South China Sea that abuts the oil sea routes, is often put into this category although so far ship hijacking or sinking by pirates has been rare – at-sea "mugging" is the usual crime committed by pirates.

The largest supply disruptions in modern history, as mentioned earlier, have been the deliberate decisions of the OPEC cartel. China understandably worries that OPEC might again brandish its oil power through production cuts and embargoes in a bid to shape the behavior of oil-consuming nations embroiled in some conflict in which OPEC has a vital stake. The major impact would be a sharp rise in world oil prices for everyone. Although hypothetically China could be selectively embargoed by OPEC under pressure from the United States, the feasibility of enforcing it would be slim to nil. The world market is so seamless that oil supplies can be obtained from non-embargoed sources, at the same (albeit inflated) price that everyone pays. This is what happened during the great oil embargo of 1973 declared by OPEC against the United States. Prices skyrocketed because of the large production cutback, but OPEC could not prevent non-embargoed nations from selling oil to the United States. The embargo was little more than a symbolic gesture, although the cut-back in production by OPEC spread price pain everywhere and led to a global recession.

China's exposure to oil price shock caused by supply disruptions is thus exactly equal to America's exposure.

Oil producing fiefdoms in the Middle East have far less latitude today to brandish the oil sword against thirsty consumers. It is often overlooked that they simply cannot afford to stop selling oil on the world market, lest their own oil-export-dependent economies collapse. The world's largest exporter by far, Saudi Arabia, for example, cannot stop pumping oil without shattering its fragile social contract with its own population. The House of Saud has suffered nearly two decades of large budget and trade deficits and amassed a debt of nearly 75 percent of Saudi annual gross domestic product. Revenue from oil exports has dropped sharply in real dollar terms since the 1970s, and a surging youth population and high unemployment (14 percent or greater) has resulted in a plunge in per capita oil earnings (over $22,000 in the late 1970s versus $4,500 today, in constant 2004 dollars).[29] With its social welfare system on thin ice, Saudi Arabia needs its consumers as much as they need Saudi crude. While China and other importers may feel vulnerable to Middle Eastern oil diplomacy, the dependencies are mutual. The oil production and consumption network is a perfect example of global economic interdependence.

The global integrated marketplace is thus a soft cushion against embargo pressures. It has spontaneously eliminated the ability of any state or cartel (like OPEC) to effectively enforce an oil embargo on any other nation, including China, unless an embargo is accompanied by physical enforcement, which is beyond their ability. The sole exception is the United States. Short of a physical blockade or embargo, which only the United States could impose, no sanction can effectively constrict the flow of oil around the world. Although any production cut-backs accompanying an embargo would raise world prices for everyone, it is the price mechanism, not physical mechanisms that would ration the allocation of oil.[30]

China's exposure to oil price shock caused by supply disruptions is thus exactly equal to America's exposure, and to all other nations around the globe regardless of their dependence on oil imports. The exposure is the same for nations that import all of their oil, such as Japan, as it is for nations that produce more oil than it needs, such as Britain. Britain's self-sufficiency in oil did nothing to shield British consumers from the sudden spike in gasoline prices in the summer of 2000. In the world oil market it does not matter how much energy a nation produces domestically or buys from abroad. The domestic oil producers follow the money (i.e., their economic interests). They

are not going to sell their gasoline at home for lower prices than they can get from foreign buyers, unless of course they are domestically regulated by price controls. Such are the laws of the global marketplace.

In the case of China, however, its domestic energy scene is not yet well integrated into the world market and is subject to various state-governed regulations. Chinese consumers are shielded more than modern industrial nation's consumers from price shocks in the world oil markets, but China as a nation is not shielded any more or less than other nations from the cost of importing oil. At the current import level, every dollar increase per unit will lead to $1 billion of new cost to China on oil imports a year. China paid a $15 billion more for oil imports because of price hikes in 2005 than it paid in 2004.[31] China would join the crowd of nations spending larger sums of cash on oil, and would reduce its consumption and its gross domestic product proportionately to its reduced consumption.[32]

> With the sole exception of the "outlier" case of an oil blockade imposed on China by the United States, the key issue in China's energy security is prices.

These laws generally transcend geopolitics. During the Cold War, oil and gas flowed freely between nations practically irrespective of their nuclear superpower associations. Today, the United States directly or indirectly imports oil from the pariah states on its sanctions list – Iran and Libya, for example. Despite severe strains in relations between Venezuela and the United States, the former exports most of its oil to the latter. It politically prefers to export to China, which shares the sentiment, but the transportation costs make it uneconomical. Similarly, China has gone on a deal-making spree for oil commitments from nations around the world regardless of their political and ideological coloration. During the Cold War China applied a political litmus test in forging economic partnerships with other countries; the relations of those countries with the United States or the Soviet Union weighed heavily in China's consideration. Today China's economic interests outweigh all other considerations.

In sum, suppliers in the world oil market follow their economic interests. The key issue is not whether global oil reserves are "peaking", or how much oil is produced domestically, or how much is bought from particular countries, or whether sanctions and embargoes have been declared. With the sole

exception of the "outlier" case of an oil blockade imposed on China by the United States, the key issue in China's energy security is prices. Its energy vulnerability depends on the price of energy in general, and the price of a barrel of oil on the world market in particular. The price of oil substitutes, such as gas, is also central to China's energy security. Gas prices will figure increasingly prominently into the equation within five years because a world gas market similar to the world oil market will emerge in this time frame. Gas can be substituted for oil in many areas and the maturing of the world gas market will enhance China's agility in adapting to oil supply disruptions. But even so the price of oil will remain the central question of China's future energy security.

Scenario 1: Saudi Oil Disruption

The nature of international markets, therefore, makes for a considerable buffer against any disruption to global oil supply. In addition, as we have seen, the blockade of energy imports to China by the United States is a distant possibility. Yet, even a remote chance of such an incident happening has rightly planted a seed of fear for many Chinese strategists when considering China's overall energy security. Such fears are often blown out of proportion, and have the potential of engendering adverse affects on strategic policymaking. Hence, assessing the impact of an oil supply disruption on China's economy serves to put into perspective the real threat to the nation's economic stability.

While calculating such economic affects of energy supply interruption is an inexact science, rough estimates may be derived from available data on China's overall energy consumption, total oil consumption, the amount of energy used to produce $1 of GDP, the capacity to substitute coal or gas for oil, and assumptions about the amount and duration of the oil disruption.

Assessing the impact of an oil supply disruption on China's economy serves to put into perspective the real threat to the nation's economic stability.

We consider two scenarios. The first scenario assumes that all of the oil exports of Saudi Arabia suddenly disappear from the world market. For current purposes it is immaterial whether this disruption is the result of a Saudi embargo, nuclear terrorism against the Saudi oil complex, revolutionary regime change,

or other causes. The second scenario assumes an oil blockade is imposed on China by the United States during a confrontation.

In the case of Saudi oil disruption, estimated Saudi daily exports for the notional period (2005 timeframe) are 8.7 million barrels per day.[33] The sudden cessation of this flow reduces the world oil supply by that same amount until other oil producers ramp up their output to compensate for the Saudi loss, or until nations start drawing on government reserves which in effect increases available world supply. Saudi Arabia, however, is the only oil producer with excess oil production capacity (normally about 2 million barrels per day surge capacity) at the present time. Since Saudi Arabia is shut down in this scenario and cannot offset its own supply disruption, any offsetting surge in supply must come from withdrawals from strategic petroleum reserves of the United States and other nations. Assuming these reserves are immediately tapped at a daily rate of 1.2 million barrels per day, the net world loss due to Saudi paralysis is reduced to 7.5 million barrels per day.

Given that world oil production in the notional period is 83.8 million barrels per day, the loss of 7.5 million barrels represents a reduction of 9 percent of global supplies. As an immediate consequence, the price of a barrel on the world market doubles or triples, depending on the price elasticity of oil. Recent Rand and Brookings studies assume an initial elasticity of 0.10 and 0.05, respectively.[34] According to the U.S. Department of Energy, the elasticity in world oil markets varies according to the initial baseline price.[35] At a notional baseline price of $35 per barrel, and using the Energy Department's formulas, we estimate the price elasticity to be 0.075, which lies exactly at the mid-point between the Rand and Brookings assumptions. In the current psychological climate of oil scarcity, however, we do find the more inelastic lower number of 0.05 to be quite plausible, and therefore have assumed that elasticity lies between 0.05 and 0.075. (Price elasticity refers to the percentage change in price that results from a 1 percent change in supply; to illustrate, an assumed elasticity of 0.05 means that a 1 percent cut in supply causes a 20 percent increase in price, and by the same token a 1 percent increase in supply leads to a 20 percent decrease in price.)

A 9 percent reduction in world supply translates into a price increase of 120 to 180 percent, assuming elasticities of 0.075 and 0.05, respectively. The new price of a barrel of oil rises to between $77 to $98 dollars, respectively. This price shock then weakens the Chinese economy in two fundamental

ways. Economists refer to these mechanisms as the real-income effect and the business-cycle effect.[36] The former captures the additional cost of imported oil resulting from the price spike, and adds to this extra expenditure the adverse affect on productivity resulting from businesses having to substitute other inputs for the lost oil. The business-cycle effect captures the higher unemployment and lower spending caused by higher oil prices, which may lead to a major recession if the inflationary pressure of higher oil prices leads governments to tighten monetary policy and raise interest rates.[37] Much of the adverse effect, in other words, may stem from government interventions rather than from the direct effects on the cost of business operations.

These mechanisms work differently in China than in market economies like the United States, and in the Chinese case we could not find or create a good model of them. In both cases, simple correlations between oil price hikes and gross domestic product have been empirically derived by economists and suffice for our purposes. According to a study carried out by China National Petroleum Corporation (CNPC), which are used in the calculations below, statistics between 1993 and 2000 show that a 1 percent rise in world oil prices would decrease Chinese GDP growth by 0.01 percent.[38] (A more recent study by the Chinese Academy of Sciences shows an even smaller economic impact with increasing oil prices.[39] See Appendix A for the two reference points.) Therefore, according to the CNPC study, a price increase of 120 to 180 percent would be expected to reduce GDP by 1.2 to 1.8 percent. (Interestingly, the U.S. Department of Energy's rule-of-thumb formula is identical for the second year of a price spike – U.S. GDP would decline 1.2 to 1.8 percent in the second year, but only 0.6 to 0.9 percent in the first year.)[40]

To validate these estimates for the Chinese case, we applied a somewhat more sophisticated model of the impact of the oil shock on China's economy. We: (1) calculated the amount of reduced oil consumption that would result from the oil price hike; (2) calculated the corresponding amount of reduced energy consumption (in units of thermal energy) for the year; (3) divided the energy consumption reduction by the energy intensity quotient for China (energy intensity is the amount of energy in units of thermal energy expended in generating one dollar of GDP) to yield the total dollar amount of GDP reduction for the year; and (4) divided the total dollar GDP reduction by the baseline total dollar GDP projected for the year in the absence of any oil shock.[41] Using reliable data published by the U.S. Department of Energy and

by a U.S. Congress Commission report,[42] we estimate that the hypothesized scenario would lead to a decline of 1.47 to 2.93 percent of GDP. In simple algebraic steps, we derived this estimate as follows (see Appendix B for an advanced mathematical expression of the relationship between reduced oil supply and reduced GDP):

1. The oil price hike as calculated earlier would reduce China's oil consumption by 630,000 barrels per day (it is interesting to note the real-world statistic that in 2005 China expected to import 310,000 barrels per day from Saudi Arabia) because of a 9 percent reduction in China's regular consumption of 7 million barrels of oil per day.
2. The corresponding amount of reduced annual energy consumption equals 1.35 quadrillion Btu (630,000 barrels times 365 days/year times 5.879 million Btu/barrel).
3. The corresponding reduction of annual GDP equals $50 billion (1.35 quadrillion Btu divided by 27.000 Btu – the amount of thermal units expended in generating one dollar of GDP in 1997 constant dollars).
4. We calculated the percentage reduction of China's GDP at 2.93 percent ($50 billion divided by $1.706 trillion, the total projected GDP for 2005 in 1997 constant dollars).
5. We assumed that China mitigated the GDP decline by substituting coal and gas for some of the lost oil at a rate proportionate to a 0.02 percent cross-elasticity of fuels, which "softened" the annual GDP decline by about half, to 1.47 percent decline instead of 2.93 percent. However, the current breakneck pace of China's coal extraction with the industry operating at full capacity raises doubts about China's ability to substitute much coal for oil.[43] Therefore, our estimate of the adverse impact of the oil shock on China's GDP lies between 1.47 and 2.93 percent.

This more complex calculation yields a mid-point estimate of 2.2 percent GDP decline, compared to the earlier calculations based on simple rules-of-thumb that yielded a mid-point estimate of 1.5 percent GDP decline. The average of these two mid-points is 1.85 percent annual GDP decline. China's economic growth would thus contract from the notional level of 9.5 percent annual growth (2005 timeframe) to 7.65 percent growth, which is still roughly double the U.S. economic growth rate. The cost to China of this drop in eco-

nomic output would be about $32 billion. In addition, China's import oil bill would double or triple; the higher price of oil ($77 to $98 per barrel instead of the baseline $35) would add another $25 to $38 billion to the overall blow to the economy. (This calculation assumes that baseline net oil imports of 2.3 million barrels per days would be reduced by 630,000 barrels per day; China would pay an extra $42 to $63 dollars for each of the 1.67 million barrels of oil imported each day.) The extra cost of oil would roughly cancel out China's typical current account surplus.

In sum, the sudden cessation of Saudi oil exports would cost the world a bundle, and China's share of the pain would amount to approximately $57 billion to $70 billion dollars for 2005. Larger economies such as the U.S. economy would suffer comparably in GDP terms, and far more in absolute dollar terms. (The U.S. oil import bill increase would be quadruple China's sticker shock, but the recessionary effects might be weaker owing to the several-fold higher efficiency of U.S. energy consumption compared to China.) Without minimizing the economic adversity caused by this oil shock to China's system, and the possible domestic political fall-out from a slow-down, it seems reasonable to conclude that China's economy would remain healthy. China's economic growth would still exceed the 5 percent annual GDP growth rate needed to absorb its still expanding labor pool and thereby stave off social instability caused by widespread unemployment.

Scenario 2: U.S. Oil Blockade from Middle East

It is commonly held that a U.S. blockade of oil imports to China would flatten China's upward economic trajectory or, worse yet, throw the country into a deep recession. A rigorous assessment would have to weigh a plethora of factors ranging from the scale and duration of the blockade to the availability of suitable energy substitutes for oil. In this case, however, the context of the scenario is especially pertinent to the analysis. In our judgment, as argued earlier, an oil blockade is not likely to be undertaken as an opening gambit in a test of nerves over Taiwan or some other vital interest. As discussed previously, this would be an incendiary act that in all likelihood would escalate a diplomatic crisis into a military conflict. For the sake of argument, this section will assume an isolated partial oil blockade on China and estimate its impact on the economy.

In this scenario, we assume that the U.S. Navy polices the key chokepoints

along the supertanker routes to China in order to deny passage to vessels bound for China from the Persian Gulf. In the notional timeframe (2005), the amount of oil delivered daily to China from Gulf sources is estimated to exceed 2.3 million barrels per day, which represents 60 percent of total China oil imports. The largest suppliers are Iran and Saudi Arabia at about 400,000 and 300,000 barrels, respectively. Oman and Sudan, though not technically considered Persian Gulf countries, export about 350,000 and 175,000 barrels, respectively.

This partial blockade does not reduce the world oil supply except to China. In theory, prices would actually drop considerably as 2.3 million barrels of oil return to the world supply after failing to reach their intended destination. Assuming price elasticity of 0.05 to 0.075, the surplus would drive the price of a barrel of oil down from $35 (notional baseline price) to between $14 and $21.[44] This blockade bonus would be enjoyed even by China as cheaper oil found its way into its import stream, albeit a stream that has contracted by some 60 percent of its original flow.

The simple formula applied earlier (scenario A) can be used to show the positive effect on China's GDP of the lower prices for 40 percent of its oil imports. Basically, the Chinese economy would be boosted by 0.16 to 0.24 percent GDP growth (0.4 times 0.4 to 0.6 percent), or roughly $4 billion per year. And China would save a bundle (about $9.5 billion per annum) by buying its allowed quota of 1.5 million daily barrels of imported oil at lower prices.

The negative side of the ledger suggests acute duress, however. The blockade deprives China of 60 percent of its normal oil imports, and one third of its total oil consumption. Using the complex formula applied earlier, we estimate that China's GDP would plunge by 5.4 to 10.8 percent, depending on China's capacity to accelerate coal mining and gas extraction. Assuming the mid-point of this range is the actual amount of the decline, then China's GDP drops by 8.1 percent for 2005, practically wiping out the predicted growth rate of 9.5 percent. The dollar amount of the loss of growth is roughly $183 billion, which improves to about $170 billion after adjusting for the small gains described above that accrued as a result of the cheaper oil prices on the limited Chinese imports.

This blow to the Chinese economy would clearly be quite severe and it would threaten its long-term health. Viewed through a conventional macro-

economic prism, such a recession would be doubly painful for a nation whose growing labor pool demands continuing high GDP growth to avoid high rates of unemployment. But of course the context of this scenario, a conflict with the United States involving an oil blockade, would brush aside this conventional economic analysis as other structural shifts take place during a national security emergency. Oil price and energy consumption elasticity coefficients might change in unexpected ways if the Chinese economy shifted to a war footing.

Implications for China

The Chinese economy is more resilient to oil price shocks caused by supply disruptions than may be commonly believed. In the event of the sudden and total disappearance of Saudi oil from the global supply, the adverse impact of the resulting price spike on China's economy would not be severe. The net world loss of oil supplies due to Saudi paralysis would represent 9 percent of global supply, triggering a tripling of the world price, but by our calculations China's annual GDP would decline by less than 2 percent. China could easily ride out this disturbance. (China could even more easily ride out an Iranian decision to make good on its threat to stop exporting oil in retaliation for world pressure to end its nuclear program; Iran's daily export is less than one-half of Saudi Arabia's.)

China's energy security planners may be further comforted by our argument that no plausible scenarios exist in which China can be deprived of its Middle East oil imports by an embargo or production cut. One reason is that the OPEC cartel cannot wield its oil power the way it once did, because of its loss of market share to non-OPEC competition, and also because the oil fiefdoms simply cannot afford to stop selling oil on the world market. It would be domestically suicidal for them to do so. In any case, China could not be selectively embargoed by OPEC or anyone else because of the infeasibility of enforcing it. And the price mechanism, not physical mechanisms, would ration the allocation of oil in circumstances of embargoes and production cuts.

If Saudi oil disappeared from the global supply, the adverse impact of the resulting price spike on China's economy would not be severe.

The one exception to this point is the case of an oil blockade imposed on China by the United States, an implausible scenario for political reasons. To be sure, plans for blockading Chinese oil imports in response to an unprovoked Chinese attack on Taiwan have surely been drawn up in the Pentagon, and the U.S. Navy could conceivably turn back super tankers laden with petroleum enroute to China during a Sino-American confrontation over Taiwan. And on paper such a blockade would bring Chinese economic growth to a standstill. By our calculations, such a blockade would deprive China of about 2.3 million barrels of Gulf oil daily, representing about 60 percent of China's normal import level and one-third of its total oil consumption, and wipe out over 8 percent of China's annual GDP growth for the notional year (2005).

As this paper shows however, the stakes would be far greater than oil and GDP growth in such circumstances. Escalation all the way up the ladder to nuclear disaster would hang over any Taiwan crisis. Therefore an oil blockade is not likely to ever be undertaken as an opening gambit in a showdown over Taiwan, or for that matter, over any other vital U.S. interest. The stakes would rapidly transcend energy security, trade, development and economic growth – national survival itself would be the core value at stake. Chinese security planners may confidently discount completely the plausibility of a deliberate U.S. oil blockade under circumstances short of war.

Managing Energy Geopolitics

Our main conclusion is that geopolitical threats to Chinese energy security are manifest only or almost only in price swings that China can readily tolerate. Chinese planners should worry less about the geopolitics of oil and focus on conservation, energy efficiency, liberalization of domestic energy investment and markets, and other domestic components of energy security. These factors, especially conservation and efficiency improvements, offer by far the most leverage on the challenge. Rigorously implementing such measures, all of which are well within China's domestic control, will also instill a high level of confidence in the nation's own capabilities to cope with its energy insecurity.

The complex and hazardous geopolitics of securing oil supply is less within China's grasp, although further steps could and should also be taken to make it more manageable. These are the responsibility of China, the United States

and the Pacific Rim region. Any such measures should address the underlying psychological component of China's energy insecurity: fear of an oil blockade by the United States, however remote its possibility. To this end, we recommend an energy and maritime security initiative (a Malacca Council) which should entail a number of basic principles.

From China's perspective, one framework for membership might be as follows. China has demonstrated three tendencies in its recent engagement with international organizations: open regionalism that avoids excluding third party countries, especially the United States; soft regionalism (China feels more comfortable participating in rather than leading an organization that highlights the presence of multiple Southeast Asian countries); peaceful regionalism (no targeting against a third country and a focus on non-traditional security issues).[45] Therefore, a viable arrangement for such a body would be one composed of and equally initiated by Northeast Asia's energy-dependent, high energy-consuming states, China, Japan, and South Korea, the United States and the Malacca states (Singapore, Malaysia, Indonesia), with an open-ended structure to allow other interested nations to join.

Such measures should address the underlying psychological component of China's energy insecurity – fear of oil an blockade by the U.S.

This Malacca Council would be organized primarily as both an economic and security forum. All states could either contribute with investment and equipment to protecting the Malacca Strait and the sea lines of communication or participate in their defense by sending patrol personnel. Core tasks would also include consultations and information exchange on counter-piracy operations, a collective strategic petroleum reserve, participation in humanitarian assistance on the sea in case of emergency and preventive measures to reduce ocean pollution.

This body would be a new entity, though it should incorporate many of the constructive elements of current security initiatives. For example, its scope could extend beyond strictly energy and maritime concerns to encompass other closely relevant non traditional security areas, especially environmental issues. A model for this principle could be the Energy, Environment and Security in Northeast Asia Project (ESENA), a program which was conceived to bring the United States and Japan together to promote environmentally

sustainable and secure energy.[46] This would provide cross-linkages of interests, especially between Japan and China, where accommodation on serious environmental concerns would be a strong incentive for cooperation. Such a platform could be utilized in a greater political regional context so as to enhance prospects for peace.

The Proliferation Security Initiative (PSI) and its close cousins, the Regional Maritime Security Initiative (RMSI) and the Container Security Initiative (CSI) are important as models to the extent that they include the United States as a central player to regional security and call for collective security cooperation on mutual concerns. But these have largely been unacceptable to many interested countries in their present form and function primarily because they are seen as dominated by the United States and in the case of the PSI, directed at certain countries, especially North Korea.[47] For the Malacca Council to be effective, however, it would need to place all the major players on an equal footing and not be directed at any one country. The Korean Peninsula nuclear crisis and relevant proliferation concerns are certainly large obstacles to accomplishing any form of consensus on regional security issues, but, as some have suggested, the six party talks, especially if successful in resolving that crisis, may be a platform to launch the kind of energy and maritime security initiative conceived of here.[48] In addition, while the nuclear crisis is a short to medium term contingency, energy security and related geostrategic concerns are longer term issues and thus the outcome of the one may not preclude the prospects for the other.

The Regional Cooperation Agreement on Anti-Piracy in Asia (ReCAAP) probably holds the greatest value as a model for such an energy and maritime security mechanism. Being an indigenous pan-Asian initiative it has made some very promising steps by dealing with piracy in Southeast Asia and has led to greater information sharing amongst member states.[49] However, it has been criticized for not having strong enforcement authority and member states are not bound to comply. In addition, as an initiative originating in Japan, China remains apprehensive of supporting it. Indonesian and Malaysian hesitation to ReCAAP also highlights the political sensitivities of securing agreements between the littoral states and other interested parties.[50] Most importantly, considering that any initiative which effectively addresses American, Chinese and other Asia Pacific nations' security concerns, a Malacca Council will need to include the United States as a fully engaged member.

Any security arrangement cannot be sustainable without addressing the wartime issues. In this case, the shadow of a potential conflict over Taiwan between China and the United States in the West Pacific hangs over the whole region. Thus, one further principle would greatly increase the initiative's chances at success. Under the security arrangement suggested above, we recommend a principle designed to prevent any future energy crisis over Taiwan. A security initiative should in essence distinguish between peace time measures amongst member states and a 'no first use' policy for blockade in the contingency of an armed conflict. 'No first use' here refers to the following voluntary declaration: not to be the first to use military means to blockade or endanger the international shipping lanes, particularly energy transportation, in times of wars or conflict. In such declarations would be the explicit understanding that if any member nation breached this declaration and used military means to blockade or endanger another country or region's shipping, the other member states would be released of their no first use obligation and could resort to countermeasures. This would prevent China from using blockades against Taiwan, which the United States is concerned about but it would also prevent the United States from using oil blockades against China. This being the most likely flashpoint for conflict and blockade in the West Pacific, the whole region would benefit. This security foundation would greatly increase confidence in the region for introducing various cooperative measures in times of peace. Naturally, the efficacy of any such 'no first use' policy could be questioned on several grounds, but it would still have an important political utility that dissuades participating countries from a behavior dangerous to the whole community. Multilateral naval cooperation in particular could not only strengthen crisis management, but also provide reassurance that blockade operations could not be suddenly implemented without ample advance warning. This would require further strengthening of the protocols and mechanisms of Sino-American crisis management at the highest levels of government.

Appendix A:

1. CNPC study: This study illustrates the relationship between oil price fluctuation, China's oil imports and change in GDP between the years 1993 and 2000. For each 1 percent increase in the world oil price lasting for a year, China's GDP will be reduced by an average of 0.01 percent. As a measure of its accuracy, in 1999, while the world oil price rose by 10.38 percent, China's GDP growth sustained a decrease of 0.07 percent. In 2000, an increase in oil price of 64 percent led to a reduction in GDP growth of 0.7 percent.

2. Study by the Center for Forecasting at the Science of the Chinese Academy of Sciences. It indicates, for example, that for every 5 percent, 50 percent and 100 percent of increase in world oil price, China's actual GDP will decrease by 0.029 percent, 0.137 percent and 0.159 percent, respectively. The study includes a range of other impacts from the rise of oil prices caused by the decrease in China's rural and urban residents' expenditure, to China's total investment and the exchange rate of the renminbi exchange.

Appendix B:

GDP Decline as a Function of Global Oil Supply Reduction*

* (The authors wish to thank our colleague Haninah Levine, a science fellow at the World Security Institute, for the mathematical derivation given in this appendix.)

The expression below, derived from the simple algebraic steps 1-5 on page 49-50, relates GDP decline to oil supply loss: $\%G = \left(\frac{1}{I \times G}\right) \times \left(\frac{\Delta S_{gl}}{S_{gl}}\right) \times \left[C_{oil} - \left(\chi \times \frac{1}{E} \times C_{coal/gas}\right)\right]$

Where:

%G = percent change in China's GDP

I = oil intensity of China's economy before the oil shock

G = China's GDP before the oil shock

S_{gl} = total global oil supply

C_{oil} = China's consumption of oil before the oil shock (in Btu/year)

χ = cross-elasticity of fuels

E = initial price elasticity of oil

$C_{coal/gas}$ = China's total consumption of coal and gas before the oil shock (in Btu/year)
The derivation of this expression $\%G = \left(\frac{1}{I \times G}\right) \times \left(\frac{\Delta S_{gl}}{S_{gl}}\right) \times \left[C_{oil} - \left(\chi \times \frac{1}{E} \times C_{coal/gas}\right)\right]$,
from the five steps on page 49-50 is as follows:

1. $\Delta C_{oil} = \left(\frac{\Delta S_{gl}}{S_{gl}}\right) \times C_{oil}$, where C_{oil} = China's initial consumption of oil and S_{gl} = global supply of oil. There is, incidentally, an assumption here that oil shortfall will be equally distributed across all consumers, or at least that China's proportionate shortfall will equal the global mean.
2. $\Delta C_{tot} = \Delta C_{oil}$, where ΔC_{tot} is the change in China's total energy consumption.
3. $\Delta G = \Delta C_{tot} \times \frac{1}{I}$, where G = China's initial GDP and I = China's energy intensity.
4. $\%G = \frac{\Delta G}{G}$, where %G is the percent change in China's GDP.
5. This step revises the calculation of step 2. A new formula is introduced implicitly, $\Delta C_{coal/gas} = \chi \times \left(\frac{\Delta P_{oil}}{P_{oil}}\right) \times C_{coal/gas}$ where $C_{coal/gas}$ is China's consumption of coal and gas, χ is the cross-elasticity of coal and gas consumption to oil price, and P_{oil} is the price of oil.

The expression for the total change in China's energy consumption is now $\Delta C_{tot} = \Delta C_{oil} - \chi \times \left(\frac{\Delta P_{oil}}{P_{oil}}\right) \times C_{coal/gas}$. This expression is now substituted into the formula $\%G = \Delta C_{tot} \times \frac{1}{I \times G}$, as follows: $\%G = \frac{1}{I \times G} \times \left[\Delta C_{oil} - \left(\chi \times \frac{\Delta P_{oil}}{P_{oil}}\right) \times C_{coal/gas}\right]$
Next, we substitute for ΔC_{oil} , as above: $\Delta C_{oil} = \left(\frac{\Delta S_{gl}}{S_{gl}}\right) \times C_{oil}$. We also substitutefor $\Delta P_{oil}/P_{oil}$, as obtained earlier in the paper: $\frac{\Delta P_{oil}}{P_{oil}} = \frac{1}{E} \times \left(\frac{\Delta S_{gl}}{S_{gl}}\right)$, where E is the price elasticity of oil. We therefore obtain:

$$\%G = \frac{1}{I \times G} \times \left[\left(\frac{\Delta S_{gl}}{S_{gl}}\right) \times C_{oil} - \left(\chi \times \frac{1}{E} \times \left(\frac{\Delta S_{gl}}{S_{gl}}\right) \times C_{coal/gas}\right)\right]$$
$$= \left(\frac{1}{I \times G}\right) \times \left(\frac{\Delta S_{gl}}{S_{gl}}\right) \times \left[C_{oil} - \left(\chi \times \frac{1}{E} \times C_{coal/gas}\right)\right]$$

Notes

[1] Zha Daojiong, "China's Energy Security and Its International Relations," paper presented at the Third IISS Global Strategy Review, Geneva, Sept. 16-18, 2005.
[2] Zhang Wenmu, *China's National Security Interests in the World Geo-Political System*, Shandong People's Press, 2004, pp. 293-304; and Dan Blumenthal and Joseph Lin, "Oil Obsession: Energy Appetite Fuels Beijing's Plans to Protect Vital Sea Lines," Jun. 7, 2006. See: www.aei.org.
[3] James P. Muldoon, Jr., "The Impact of 9/11 on Chinese Regional Security Cooperation," Vol. 4, Issue 12, Jun. 10, 2004. See: www.jamestown.org.
[4] Gal Luft, "Spotlight - Fueling the dragon: China's race into the oil market," *Institute for the Analysis of Global Security*, 2003. See: www.iags.org/china.htm;_and George L. Perry, "The war on terrorism, the world oil market and the U.S. economy (Analysis Paper #7)," *The Brookings Institution*, Oct. 24, 2001; and U.S.-China Economic and Security Review Commission, "China's energy needs and strategies," *2005 Report to Congress of the U.S.-China Economic and Security Review Commission*, pp.164-171; and U.S. Department of Energy, Energy Information Administration, "Appendix A & D," *International Energy Outlook 2004*, pp. 216, 167, 42, 40; and U.S. Department of Energy, Energy Information Administration, "Table 20: International petroleum supply and disposition summary," *International Energy Outlook 2005*.
[5] George Anderson, "Markets, geopolitics, energy, security and sustainability," presented at the 19th *World Energy Congress*, Sidney, Australia, Sept. 5-9, 2004.
[6] Zhang Jianxin, "U.S. hegemony and international oil politics," *Journal SJTU* (philosophy and social sciences), No. 2, 2006; Shi Dan, "World oil supply-demand and hidden resources competitions: analysis of the energy strategy under the U.S. military operations," *Reform*, No. 1, 2002, pp. 119-127.
[7] Chen Fengying and Zhao Hongtu, "Global Energy Structure," Shishi Publishing House, 2005, pp. 90-97; Esther Pan, "China, Africa and oil," *Council on Foreign Relations*, Jan. 12, 2006. See: www.cfr.org/publication/9557/. In February 2006, Angola overtook Saudi Arabia as China's leading oil supplier.
[8] For an excellent analysis of the vigorous assertion of American primacy and its consequent militarization of foreign policy, see: Richard K. Betts, "The political support system for American primacy," *International Affairs*, Vol. 81, No. 1, January 2005.
[9] Gao Zichuan, China's maritime security in the early 21st Century," *Contemporary International Relations*, Serial No. 197, March 2006.
[10] Shibley Telhami, "The Persian Gulf: Understanding the American oil strategy," *The Brookings Institution*, Feb. 20, 2005. See: www.brookledu/press/REVIEW/spring2002/telhami.html.
[11] Ibid.
[12] Erica S. Downs, *China's Quest for Energy Security*, RAND Corporation, 2000.
[13] Qiu Zhenhai, "From preventing Malacca risks to systematic energy strategy," *World*,

Issue 6, 2006; Wang Wei, "Can China break through the chains of containment," Selected Readings for the Leadership, Nov. 2005; Yan Wenhu, "Analysis of the impacts of oil for China's peaceful rise," *Journal of the University of Petroleum*, Vol. 20, No. 6, December 2004, pp. 1-5.

[14] Tu Jianjun, "The strategic considerations of the Sino-Saudi oil deal," *The Jamestown Foundation, China Brief 6.4*, Feb. 15, 2006.

[15] Interviews with senior naval combatant commanders with responsibility for the Pacific combat zone and SLOCs.

[16] Roland Dannreuther, "Asian security and China's energy needs," *Oxford University Press* and *The Japan Association of International Relations*, 2003.

[17] Gao Zichuan, "China's maritime security in the early 21st century," *Contemporary International Relations*, No. 197, March 2006.

[18] See Bill Gertz, "China builds up strategic sea lanes," *The Washington Times,* Jan. 18, 2005. According to a recent Pentagon report cited by Gertz, the Iraq war revived China's concern over the impact of a U.S. naval blockade of China's energy imports, or of a disturbance in the Middle East that disrupts oil supplies to China.

[19] Interviews with senior naval combatant commanders with responsibility for the Pacific combat zone and SLOCs.

[20] For a Chinese perspective on China's limited ability to defend its seaborne trade, and its interest in multinational naval cooperation to protect its sea lines of communications, see Ji Guoxing, "SLOC security in the Asia-Pacific," *Asia-Pacific Center for Security Studies*, Honolulu, Hawaii, February 2000. See: www.apcss.org/Publications/Ocasional%20Papers/OPSloc.htm.

[21] Roger Cliff, "China's military modernization and the cross-strait balance," testimony before the U.S.-China Economic and Security Review Commission, Sept. 15, 2006. See: www.rand.org/pubs/testimonies/2005/RAND_CT247.pdf.

[22] Gen. Douglas MacArthur, "Farewell Address to Congress," Delivered on April 19, 1951. "Our strategic frontier then shifted to embrace the entire Pacific Ocean, which became a vast moat to protect us as long as we held it. Indeed, it acts as a protective shield for all of the Americas and all free lands of the Pacific Ocean area. We control it to the shores of Asia by a chain of islands extending in an arc from the Aleutians to the Mariannas held by us and our free allies. From this island chain we can dominate with sea and air power every Asiatic port from Vladivostok to Singapore – with sea and air power every port, as I said, from Vladivostok to Singapore – and prevent any hostile movement into the Pacific."

[23] Gao Zichuan, "China's maritime security in the early 21st Century," *Contemporary International Relations*, No. 197, March 2006; Sun Junyan, Jia Dashan, "China's sea-borne oil transportation security system and its evaluation," *Water Transportation*, Vol. 27, Issue 9, September 2005, pp. 22-25; Chen Huifen, "Tough geopolitical situation for China's oil security and strategic countermeasures," *Ecological Economy*, November 2005.

[24] Li Li and Lin Ao, Dalian Naval Academy, "Legal issues concerning seaborne blockade warfare," *Studies of Political Affairs*, December 2003.

[25] Yue Laiqun, "Breaking the Malacca dilemma: Analyzing the Malacca Strait and China's oil sea transportation lines," *China Petroleum Enterprise*, pp. 6-9. The author is an analyst with the Center for Oil and Gas Strategic Studies under the Ministry of Land and Resources. "If a technological power attacks the oil transportation lanes and infrastructure facilities of another technological power, it will face more tragic and violent retaliation."

[26] Cheng Gang, "China's worries on the sea," *Global Times*, Dec. 29, 2003; An interview with Jiang Zhijun, director of the Chinese Naval Research Institute of the PLA Navy, Jan. 2, 2004; "We will try to project an equal deterrence – if you dare to threaten our international sea routes, then we have ways to threaten your safety in various ways, including your safety of sea travels."

[27] Liu Huaqing, "Memoir of Liu Huaqing," PLA Publishing House, 2004, p. 233.

[28] Purnomo Yusgiantoro, "Markets, geopolitics, and energy security," presented at the 19th *World Energy Congress*, Sidney, Australia, Sept. 5-9, 2004.

[29] U.S. Department of Energy, Energy Information Administration, "Saudi Arabia country analysis brief," January 2005. See: www.eia.doe.gov/emeu/cab/saudi.html.

[30] For a useful discussion, see Michael A. Toman, "International oil security problems and policies," *The Brookings Institution*, Feb. 20, 2005. See: www.brook.edu/press/REVIEW/spring2002/toman.htm.
Also see: Pietro S. Nivola, "Energy independence or interdependence," *The Brookings Institution*, Feb. 20, 2005. See: www.brook.edu/press/REVIEW/spring2002/nivola.htm.

[31] "How China can have an influence on pricing in international trade?" *Xinhua News*, Dec. 12, 2005.

[32] Robert Blohm, "Energy price increase is good news for China," *China Daily,* Jun. 13, 2006. See: www.chinadaily.com.cn/opinion/2006-06/13/content_615090.htm.

[33] Total daily production capacity is between 10.5 and 11 million barrels. See: U.S. Department of Energy, Energy Information Administration, "Saudi Arabia country analysis brief," August 2005. See: www.eia.doe.gov/emeu/cabs/saudi.html.

[34] Rand Corporation, "Fault lines: GDP effects of an energy price shock," *Energy Bulletin*, Jan. 1, 2003. See: www.rand.org/publications/MR/MR1686MR1686.ch6.pdf. See also: George L. Perry, "The war on terrorism, the world oil market and the U.S. Economy," *The Brookings Institution*, Oct. 24, 2001. See: www.brookings.edu/printme.wbs?page=/pagedefs/0e1ff3240a07ff3b7fffc0ba0a141465.xml.

[35] U.S. Department of Energy, Energy Information Agency, "Rules-of-thumb for oil supply disruptions," Sept. 2, 2004. See: www.eia.doe.gov/emeu/security/rule.html.

[36] William D. Nordhaus, "The economic consequences of a war with Iraq," in *War with Iraq*, Kaysen, et al., American Academy of Arts & Sciences, Nov. 2002, esp. pp. 81-85.

[37] Sharp increases in the price of oil have been associated with most of the U.S. economic recessions of the last three decades. See: *War with Iraq*, Kaysen, et al., p. 83.

[38] Chen Yu and Xu Dongsheng, *Inner Mongolia Petrochemical Industry*, Issue 3, 2006, pp. 61-62; Han Gensheng, speech to *2004 China International Petroleum and Petrochemical Industry Summit*, in "Impact to be drawn from record oil price," *China Daily*, Nov. 16,

2004. Gensheng is vice president of Sinochem Corp. See also: "Japan calm despite high oil prices, but concerned about impact on exports," *Foreign Press Center/Japan,* Feb. 22, 2005. See: www.fpcfj.jp/e/shiryo/jb/0439.html; and "High oil prices not to drag down economy," *China Daily,* Feb. 22, 2005. See: www.chinadaily.com.cn/english/doc/2004-08/31/content_370456.htm.

[39] This study concludes that every 5 percent in world oil prices will bring down China's actual GDP by 0.029 percent, which is more conservative than the CNPC study in evaluating the impact of high oil price on China's GDP growth. See: Wei Yiming, Fan Ying, Jiao Jianling, Wu Gang, Zhang Jiutian, Xu Caihua, Chinese Academy of Sciences, "Forecasting of the impacts of international oil price fluctuation on China's economic growth," CEFS-06-007, Issue 0007, p. 9.

[40] U.S. Department of Energy, Energy Information Administration, "Rules-of-thumb for oil supply disruptions," Feb. 22, 2005. See: www.eia.doe.gov/emeu/security/rule.html.

[41] We applied the Rand methodology; see Rand Corp., "GDP effects of an energy price shock," Jan. 1, 2003. See: www.energybulletin.net/newswire.php?id=182.

[42] See: U.S. Department of Energy, Energy Information Administration, "Appendix A & D," *International Energy Outlook 2004*, pp. 216, 167, 42, 40; U.S. Department of Energy, Energy Information Administration, "Table 20: International petroleum supply and disposition summary," *International Energy Outlook 2005*; U.S.-China Economic and Security Review Commission, "China's energy needs and strategies," *2005 Report to Congress of the U.S.-China Economic and Security Review Commission*, pp.164-171.

[43] China (AFP), "World market could be hurt as severe coal shortage worsens in China," *Energy Bulletin*, Feb. 28, 2005. See: www.energybulletin.net/print.php?id=4537.

[44] Extending the standard economic calculations from peacetime to blockade conditions without adjusting elasticity assumptions is a questionable simplification that warrants further investigation.

[45] Zhang Xuefeng, Chen Hanxi, "Strategic impacts of China's regionalism," *World Economics and Politics*, Issue 5, 2006, pp. 26-30.

[46] The Nautilus Institute's Energy, Security and Environment in Northeast Asia. See: www.nautilus.org/archives/esena/index.html

[47] Ren Xiao, "Six-Party Talks and the Possibility of Building A Multilateral Security Mechanism in Northeast Asia" in *International Studies,* 2005, No.1, pp. 38-41.

[48] Ibid.

[49] "U.S. and Asia Adapting to Combat Maritime Terrorism," Interview with Adm. Gary Roughead, commander of the U.S. Pacific Fleet, *The Asian Security Monitor,* 2006.

[50] Vijay Sakhuja, "Regional Cooperation Agreement on Anti-piracy," Observer Research Foundation, Vol. IV, Issue 22-23; July 10, 2006.

Institutional Insecurity

Kong Bo

The Key to Energy Security

Already the world's second biggest energy consumer, China is presently on track to become the world's largest user of energy by the year 2030.[1] This phenomenon has kindled a profusion of literature to address how China will meet this demand and the affect it will have on global energy security. Current analyses overwhelmingly focus on the notion that energy security is based on the assurance of reliable energy supply at a reasonable price, invoking a disproportionate emphasis on the security of China's oil supply. This is largely a result of the psychological elements arising from the uncertainty of guaranteed oil supplies for China. In reality, however, oil imports are merely one dimension of China's energy security concerns and not even the most important. Far less attention has been given to the more obscure though imperative factor of China's domestic energy institutions and their role in meeting the country's energy security challenges both at home and abroad.[2]

Energy institutions are essential because they are the instruments that shape, govern and regulate a country's energy economy. Their structure determines the performance of a nation's energy industry and its ability to safeguard its

Kong Bo *is a Ph.D. candidate in China Studies and International Energy Policy at Johns Hopkins University School of Advanced International Studies (SAIS). His research is widely published in Chinese and English and covers issues related to energy strategy and development at the corporate level as well as energy security at the governmental level.*

China Security, Summer 2006, pp.64 - 88
©2006 by the World Security Institute

energy security. Fundamentally, this ability boils down to whether institutions are able to produce and implement a coherent national energy strategy as well as foster an industry that can meet a country's growing energy needs. The parameters of China's energy institutions do not hold a high degree of uncertainty (unlike the supply of oil from abroad), however, their efficient functioning is difficult to accomplish.

In fact, the evolution of China's energy institutions has largely crippled their ability to establish and carry out a national energy strategy. Moreover, under the nation's current institutional structure, the energy industry cannot meet the challenge of securing the country's increasingly complex and burgeoning domestic energy demand. Hence, restructuring China's energy institutions in a way not previously accomplished is absolutely vital if China is to successfully address its energy security needs.

Confusing Beginnings: China's Energy Policy-Making System

Today, all aspects of China's energy institutional make-up show a high degree of organizational confusion that is largely a legacy of its complex origins. China's modern energy industry was modeled in part on the economic structure of the former Soviet Union and in part adapted to China's unique environment. The result was a perplexing array of both vertical and horizontal institutions. Vertical institutions (*tiaotiao*) included commissions such as the State Planning Commission (SPC) and the State Economic and Trade Commission (SETC) that integrated energy policies with other facets of the economy. Also in this category were line ministries in charge of specific energy industries such as coal, power, petroleum and nuclear industries. All of these contained both the central and local level government organs. The horizontal institutions (*kuaikuai*) were comprised of other non-energy ministries such as the Ministry of Finance (MOF) and the Ministry of Railways (MOR) but still maintained responsibility for some segment of the country's energy policies at central and local levels.

Today, all aspects of China's energy institutional make-up show a high degree of organizational confusion.

Vertical institutions were designed to ensure the government's central control of these key industries while the horizontal institutions were largely

the influence of the energy governance structure of the USSR. The latter purposely separated energy exploration, production, transportation, refinery, distribution and trade into different segments, creating a hodgepodge of institutions characterized by fragmentation rather than integration.[3] The energy policies that were crafted under these fragmented energy institutions demonstrated a lack of focus, consistency, and coherence. As the country moved away from a planned economy to a market economy both the *tiaotaio* and *kuaikuai* institutions have gone through a series of transformations that have manifested themselves in two respects: the restructuring of the country's energy industries and institutional reform.

Hard Path to Energy Industry Reform

Since its inception in 1949, China's energy industry has experienced multiple rounds of restructuring. These phases were characterized by conflicting measures and even frequent reversals, reflecting the government's vacillation between strong central control and greater deregulation of the country's energy sector.[4]

Except for three brief periods during which a single institution was put in charge of China's energy strategy, the country has had no central energy policy-maker, devolving authority to individual line ministries who took charge of energy policies within their specific industrial sectors. In the absence of a central decision-making body, the SPC became the default institution overseeing energy policy while regulatory authority was turned over to the SETC, all the while line ministries maintained a high degree of autonomy. Consequently, a consistent and long-term energy strategy at the national level was never in existence and instead policy was driven by each individual energy sector.

Beginning in the early 1980s, the Chinese government began divesting itself from energy production by creating state-owned energy companies and eliminating special line ministries. In the oil sector, the China National Offshore Oil Corporation (CNOOC) and the China Petrochemical Corporation (Sinopec) were set up to supervise and conduct offshore development and downstream business (i.e., refinery and distribution) respectively. Similarly, the China National Petroleum Corporation (CNPC) replaced the Ministry of Petroleum Industry (MPI) in 1998, acquiring both its administrative power over onshore exploration and production (E&P) as well as inheriting its staff and an entrenched organizational culture.

Table 1 Evolution of the Vertical Institutions (*tiao tiao*) in China's Energy Industry

	Energy institutions at national level	Central energy policy-maker
1949-1955	Ministry of Fuels and Power	Yes
1955-1969	Ministry of Coal Industry Ministry of Electric Power Ministry of Petroleum Industry Second Ministry of Machine-Building Industry	No
1970-1975	Ministry of Fuels and Chemical Industries	Yes
1975-1987	Ministry of Coal Industry Ministry of Water Resources and Electric Power Ministry of Petroleum Industry Ministry of Nuclear Industry	No
1988-1992	Ministry of Energy	Yes
1993-1998	Ministry of Electric Power (abolished in 1998) Ministry of Coal Industry (abolished in 1998) State-owned energy companies in the petroleum sector and nuclear sector	No
1998 to present	All line ministries were dissolved; State-owned energy companies were established in each sub-energy sector	No

As a result, the vertical management system virtually remained intact except under the name of state-owned oil companies (SOEs). Moreover, after these companies went public in 2001 and 2002, they had taken on multiple identities as state-owned energy companies, publicly listed companies, and as industry administrators. These conflicting interests hindered the efficient functioning of China's oil sector by creating fertile ground for market monopoly which the three oil SOEs came to enjoy and empowered them to forestall any reform measures working against their interests. Consequently, reforms in the oil sector have created a market structure where the oil SOEs have sufficient power to preserve the status quo in their favor yet they fail in effectively safeguarding the country's energy security.

Decentralization of Power and Coal Industries

The restructuring of China's power industry resembles that of the oil sector. After the Ministry of Energy was abolished in 1993, authority over China's power industry was redistributed to the Ministry of Electric Power and various forms of the State Planning Commission.[5] Power industry investment and development activities finally landed with the newly created

State Power Corporation of China (SPCC) in 1997.[6] To enhance efficiency, at the end of 2002 the SPCC was split into five power generation companies, two grid companies and four services companies.[7] As with the oil sector, these centrally controlled state-owned power companies also exercise vertical control over their regional branches.

Numerous smaller companies were also established, some of which passed to local governments and some run as independent power producers (IPPs).[8] By the end of 2002, although the SPCC controlled 90 percent of the country's transmission assets, it generated only 46 percent of the country's total power output.[9] In response, the government instituted the State Electricity Regulatory Commission (SERC) to regulate the complex hybrid of decentralized local power companies and IPPs on the one hand and vertically managed state-owned companies on the other.

The power shortages that have taken place over the last three years attest to the failure of the overhaul launched in 2002 and illustrates the impact of a malfunctioning power sector on China's energy security. Instead of promoting competition, the separation of power generation from transmission interests in reality concentrated these assets in the hands of state grid companies, thereby cementing their monopoly and hampering the formation of a viable power market. Moreover, because provincial grid companies often base their expansion on local economic development and local power needs, their proliferation has made it impossible for the country to establish a nationwide electricity distribution system. Finally, administrative authority remains in the hands of the NDRC, whose approval is necessary for all power development investment. However, it does not possess sufficient local knowledge, impeding the timely processing of project applications. Consequently, developments in the country's power sector fall victim to enduring institutional flaws, jeopardizing the country's adequate supply of electricity.

The recent power shortages illustrate the impact of a malfunctioning power sector on China's energy security.

Reshuffling of the coal industry, however, has taken on a different nature. Unlike the oil or power sector, the participation of the private sector, particularly the township and village coal mines, has been substantial. At their peak in 1996, these small coal mines produced 45.6 percent of the country's

total coal.[10] By contrast, in the same year, the state mines owned and operated by the Ministry of Coal Industries (MCI) accounted for only 38 percent of the country's production.[11] As these small coal mines boost local economies, generate employment, and supplement tax revenues, their relationships with local governments are often symbiotic. Support and protection are provided by local governments in exchange for economic benefits. Consequently, companies in the coal industry far outnumber those in the oil and power sectors, while local governments have a far higher degree of control. This process was accelerated in 1998 when the MCI was abolished and all 94 of the large state-owned coal mine companies were devolved to various local governments.[12] Hence, the vertical institutions in the coal sector that used to be run by the MCI are now entirely gone and in their place has evolved a glut of local and small coal companies, with the total number exceeding 28,000 in 2002.[13]

This excess of small coal mines is also the primary culprit for massive death tolls, appalling health safeguards, dangerous pollution levels and poor resource utilization in China's coal industry. In a country where 'coal is king', such acute decentralization undoubtedly works against the formation of a coherent energy plan. Furthermore, small coal mines, many of them illegal, often operate outside the country's energy statistical collection system, leading to wide margins or error on national data figures and complicating the country's energy policy-making.[14]

Government's Turn at Energy Policy Reform

Reforms have not been restricted to the energy industry in China. A dizzying succession of government restructurings has also negatively impacted the nation's energy governance. Since the beginning of China's reform period alone, no less than five reorganizations have been executed, which have created, abolished, and reshuffled the structure, function, and bureaucratic rank of several ministries and up to 100 ministerial-level institutions.[15] The latest of these and one of the most comprehensive to date was the massive institutional reorganization of 2003.

This multiple restructuring has produced two significant fallouts. Most importantly is the affect of numerous and irrational reorganizations on the National Development and Reform Commission (NDRC), the institution tasked with crafting and regulating the country's overall energy development.

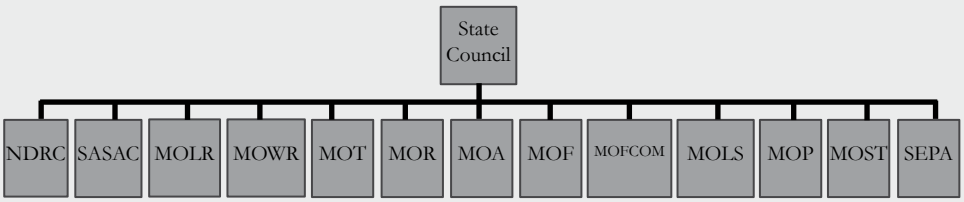
The NDRC now has the sole authority for strategic planning and regulation (e.g. approving major investment projects and setting energy prices) which effectively makes it both the policymaker and watch dog of the country's energy industry. [16] Even if this was a rational set-up, which it is not, it is an impossibly large portfolio given the commission's limited staff and resources.

A second consequence of the bureaucratic consolidation of 2003 is the redistribution of China's energy policymaking tasks into two commissions and eleven ministries. The portfolios of these thirteen institutions often overlap and yet each agency maintains equal bureaucratic rank, creating further obstruction in the decision-making process. Given the collapse of the vertical management system in China's energy institutions, the diffusion of authority over energy policy among these 13 parallel ministries only worsens the fragmentation of China's energy policymaking at the national level. These problems illustrate the dysfunctional legacy of the traditional vertical (*tiaotiao*) institutional framework.

Indeed, the reforms of China's energy institutions at both the vertical and horizontal levels have had varied effects on how the country's energy industry is governed today. The former vertical energy institutions have almost entirely collapsed in the coal industry, remain partially functioning in the power industry but are largely intact in the oil industry. Horizontal energy institutions, on the other hand, are still generally extant albeit under different names and configurations.

From a macro level, this process reveals enormous path dependence. That is, the new look of China's energy institutions are largely dependent on its past structure and function.[17] As a result, the initial fragmentation of the system has only been magnified through the reforms over the past decades, with the authority over energy planning and policy-making even more incoherent than before. Moreover, this fragmentation has worsened at both the national and local levels. The example of state-owned enterprises is telling. At the national level, they must follow instruction from the State Asset Supervisory & Administration Commission (SASAC), the NDRC as well as other ministries. At the local level they must answer to three conflicting groups: local branches of the 11 ministries, local branches of NDRC, and the upper hierarchy of the state-owned enterprise. In an era of growing dependence on foreign energy, the country's policy-making system is under strain, carrying ominous implications for meeting the country's energy security needs.

Chart 1 Horizontal energy institutions in China (*kuai kuai*)



NDRC—National Development and Reform Commission
SASAC—State Asset Supervisory & Administration Commission
MOLR—Ministry of Land and Resources
MOWR—Ministry of Water Resources
MOT—Ministry of Transportation
MOR—Ministry of Railways
MOA—Ministry of Agriculture
MOF—Ministry of Finance
MOFCOM—Ministry of Commerce
MOLS—Ministry of Labor and Social Security
MOP—Ministry of Personnel
MOST – Ministry of Science and Technology
SEPA—State Environmental Protection Agency

Portfolios of different horizontal energy institutions on energy[18]

NDRC	Responsible for planning the long-term energy development in China and implementing its annual energy development target. In addition, it is also tasked to balance the country's energy development with other sectors of the economy, set energy prices and approve investments in the energy sector both at home and abroad.
SASAC	Supervises the state-owned assets of all centrally owned energy companies and charts their reform. It also appoints corporate executives of large state-owned energy companies under its watch.
MOLR	Oversees mineral surveys and appraisals, including utilization plans, grants licenses for mineral exploration and production, and administers the registration and assignment of exploration and production licenses.
MOWR	Supervises China's hydropower development and oversees the safety issues involved in building dams. In addition, it is in charge of reviewing and approving large or medium scale dam projects.
MOT	Supervises and coordinates energy transportation by road and water.
MOR	Supervises and coordinates energy transportation by coal.
MOA	Supervises the development and utilization of renewable energy in China's rural areas.
MOFCOM	Sets quotas and issues licenses for energy imports and exports. Regulates foreign investment in China's energy sector and China's investment on the international energy market.
MOLS	Determines and regulates the income distribution and pension plans of the employees of state-owned energy companies.
MOP	Determines the personnel structure and managerial appointment of state-owned energy companies.
MOST	Supervises R&D in the energy sector and promotes new energy technology development.
MOF	Promotes renewable energy development through tax credit and financial subsidies.
SEPA	The chief government agency responsible for environment issues in China.

Impairing Energy Security Strategy

The way energy institutions are structured and operate in China predisposes the country toward a series of loosely connected policies that are inconsistent, short-sighted and ad hoc, precluding them from producing any coherent and long-term national energy strategy.

First, current energy institutions prevent China from effectively planning its energy future. By replacing energy specific line ministries with state-owned energy companies or transferring their activities to local governments, the central government has essentially given up its control over individual energy sectors. Also, by partitioning authority over energy policy into thirteen parallel ministerial organizations, the government has created a system in which no single bureaucracy has a political upper hand over others. The result is a system with 'too many cooks in the kitchen', leading to severe fragmentation of China's energy policymaking process. The resulting fragmentation of decision-making at both vertical and horizontal levels creates the 'rules of the game' in China's political system requiring negotiation and bargaining that is often protracted and inconclusive.[19] A case in point is the debate in China about whether to impose a fuel tax. The issue was raised in 1999 and debated numerous times, but no consensus has been reached between the Ministry of Finance, the Ministry of Transportation, the Ministry of Agriculture and the State Administration of Taxation (SAOT). Although the imposition of a fuel tax would greatly help to correct the skewed pricing structure and encourage demand-side conservation of oil in China, a goal that is line with China's energy security, the awkward balance of winners and losers among the horizontal institutions involved has so far prevented any policy from materializing. [20]

> The process of institutional reform and reorganization has revealed enormous path dependence.

With competing institutional interests unable to reach compromise, many of the thorny decisions are foisted on the country's leadership to solve, who invariably become overloaded. The limited capacity for intervention from the country's top leaders results in a state of inertia with the status quo characterizing the reform process in China's energy industry. Thus, rather than being proactive, the top leadership is forced to be reactive to challenges to the country's energy security.

The various institutional reforms have also led to a progressive weakening of the central government's ability to formulate national energy strategies.[21] Frequent restructurings have drained the central government of talent with human resources increasingly going to state-owned companies, representative offices in Beijing, and foreign enterprises. Consequently, the level of competency within the central government has declined while those organizations to which good talent has gone have enhanced their lobbying power at the central level.

The present state of the NDRC's Energy Bureau is a salient example of the central government's critical deficiency as an effective policymaker. The Energy Bureau is only one of over 20 sub-departments under the NDRC, and is staffed by 30 people. Similarly, the National Statistical Bureau, charged with handling energy data of the world's second largest consumer of energy, has a three-person staff.[22] By contrast, the United States, the world's top energy guzzler, has a 14,000-strong Department of Energy, of which approximately 2,000 staff map out policy and 600 collect and analyze data. The 30 people within China's Energy Bureau are overwhelmed by the deluge of daily project reviews and approvals, and have little time for drafting the country's energy policy or strategy.

China's past bureaucratic reshuffling has also created an interchange of personnel between government and industry that deeply conflicts with a pursuit of true reform such as the ability of an individual to move from a state-owned energy company to a regulatory body. For example, Chen Jinhua, former CEO of Sinopec became the director of the SPC between 1993 and 1998. Similarly, after the 1998 government restructuring, Sheng Huaren, CEO of Sinopec, became director of the SETC between 1998 and 2001. And vice versa, transfer from the line ministry to a state-owned energy company is another form of institutional exchange. Wang Tao, following his post as head of the petroleum ministry (between 1985 and 1988), became the CEO of CNPC. Finally, transfers have also occurred from the energy industry to one of the 11 horizontal ministries. The interchange of personnel has forged linkages between the government and the state-owned energy companies, ensuring the latter's influence on the former and thus forestalling any policy reform that is not in the interest of the ministries or national energy companies. At the same time, as inheritors of these linkages, the state-owned energy companies have used them to thwart reforms that curb their monopoly status. Consequently,

both government and industry are captured by these linkages and only support policies and reforms in their own interest. Decision-making is therefore ad hoc, reactive and supports the status quo. [23]

Cyclical Traps

Institutional failings also contribute to the country's cyclical energy insecurity in the form of power shortages. [24] Overinvestment by local governments, which have led to unsustainable growth and an unexpected demand for energy, has been blamed for the recent power shortages. This rationale is flawed, however, as China has sufficient coal to generate power to fuel the economy. Power shortages in some parts of China, such as the Pear River Delta area which is located far from the coal mines, can be explained in part as the result of transportation bottlenecks. However, recent power shortages swept more than two-thirds of China's provinces and localities, wreaking enormous havoc on the country's economy.[25] Power shortages of that magnitude indicate larger systemic problems that cannot be explained by local government overinvestment.

In reality, two institutional factors in the electricity sector contributed to China's recent cyclical energy insecurity. Foremost, the SDPC made a colossal blunder when drafting the country's electricity development plan following the Asian Financial Crisis. Based on then-current growth rates, the SDPC issued a policy of disallowing any coal-fired power plants for three years. As a result, investment in the power sector precipitously declined, leading to huge decreases in power capacity. [26] With rapidly rising demand for electricity far surpassing investment, power shortages emerged in 2002 and worsened thereafter.

Friction between coal prices and electricity tariffs exacerbated the power shortages. Two coal markets operate in parallel with each other in China: the first brings together large state-owned coal mines and coal consumers under long-term contracts; the other coal market is local, with coal mines producing an average of only a few hundred tons of coal per annum for small industrial, residential, and commercial consumers.[27] The large coal market accounts for 60 percent of the country's total coal production and is subject to government price controls while the small coal market, accounting for 40 percent of the country's total coal production, sells at market prices.[28] The price differential between the two can be as large as 100 RMB per ton (about $12.5 per ton).[29]

Power shortages have driven up coal prices on the market, with demands by state-owned coal producers to fairly benefit from the shift in prices. However, as power producers are also restricted by electricity price fixing, they refused to pay higher cost for coal. This struggle between power producers and coal producers has aggravated the power shortages.

Market Disincentives

A number of pricing distortions and import quota systems also work against China's oil security. The price structure of the Chinese oil market creates perverse incentives and has contributed to the recent artificial shortages of gasoline and diesel in Southern China.[30] The suppression of domestic fuel prices leads to inefficiency and even encourages consumption at a time when the country is increasingly dependent on foreign oil. In addition, by keeping the retail prices low, the country's downstream sector is put under strain because they must buy crude from the international oil market. This is true for Sinopec, which is the country's largest refinery. Crude supply from domestic oil fields controlled by Sinopec only accounts for half of the company's refinery needs. As a result, Sinopec has to pay the international price for its imported crude but sell its refined products at a domestic price – a money losing situation.[31] Therefore, when international prices are high (often the result of rising demand by China itself) there are disincentives for refineries to sell their products domestically. With cruel irony, China's exports of diesel and gasoline actually went up at the same time that fuel shortages were hitting China's south and east in 2004. Moreover, 1,200 tons of oil products were reportedly smuggled out of China every day during the period of peak fuel shortages in Guangdong Province.

> The price structure of the Chinese oil market creates perverse incentives.

The monopoly enjoyed by the three state-owned oil companies – CNPC, Sinopec, and CNOOC – also often work against China's oil security. The monopoly makes it difficult for private oil companies in China to bring more oil supply to the market. Specifically, exploration rights are monopolized by the three big oil companies, thus private oil companies in China either concentrate on the downstream sector or invest in the upstream projects abroad. With little access to upstream supply, private companies must pay high prices for

crude and sell their refined products at low domestic prices. Unlike Sinopec, however, they do not receive government subsidies. Consequently, high international prices swiftly put them at risk of bankruptcy, making the entire private sector and the competitive environment extremely fragile.

A number of dangers result from the irrational quota system as well. The primary problem is that the majority of the import quota is controlled by the big three oil companies, Sinochem and their joint ventures. If private or smaller companies obtain import quotas or produce oil overseas, they must sell crude to refineries owned by these major enterprises, essentially discouraging the private oil companies from investing abroad and bringing more oil back to China. This regulatory framework even extends to the larger enterprises. For example, before 2004, CNOOC could only import 4 million tons of crude oil because of their import quota allocation, creating the paradoxical situation where CNOOC was forced to sell the majority of equity oil to the international oil market instead of the Chinese market where demand was rising at unprecedented rates.[32]

Institutions Born Again?

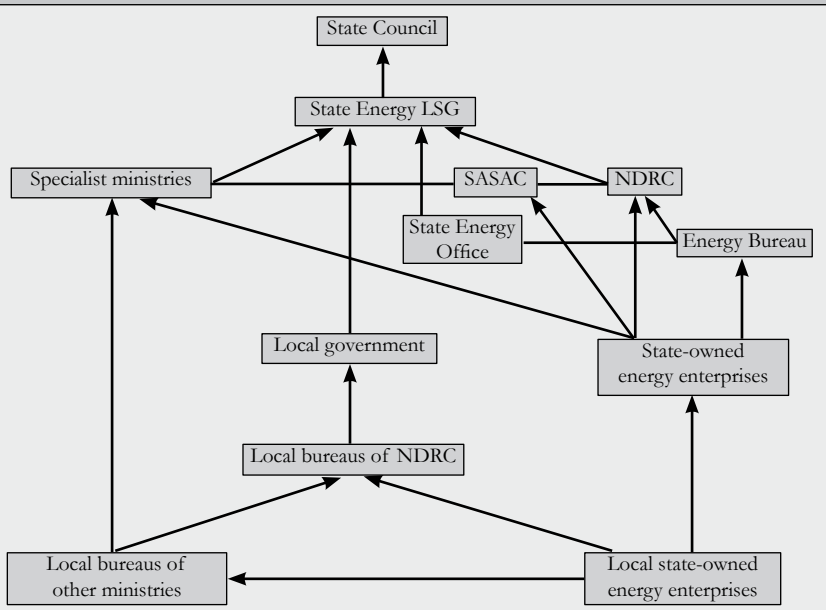
A series of developments over the last couple of years have seriously shaken the country's energy economy and have begun to elicit systemic change. This stems, in large part, from increasingly more energy crises than the country has previously witnessed. The power shortages that swept more than two-thirds of China's provinces and municipalities since 2002 have forced millions of households to suffer blackouts and brownouts and have brought hundreds of factories to a standstill, causing estimated economic losses of up to 1 trillion RMB ($125 billion) between 2000 and 2005. [33] These power shortages triggered a widespread energy squeeze across the country and led to the hording of coal by many local governments and enterprises. The overwhelming demand for coal created bottlenecks in the country's railway system, which in turn exacerbated existing shortages. Without access to adequate coal supply, many regions, particularly the Pearl River Delta area, resorted to oil and gas to generate power. These acute shortages caused ripples to other areas of energy demand including petroleum products (such as diesel) to produce electricity, competing with demand at the pump. All of this has led to sharp growth of energy imports, with annual crude imports registered at 15, 31 and 35 percent for 2002, 2003, and 2004 respectively. [34]

This sharp growth in energy demand has not only pushed up the country's growing dependence on foreign oil but has also been a main culprit in the recent hike in the world oil prices, all of which challenges China's ability to withstand possible supply disruptions and price shocks. The U.S. campaign against Iraq in late 2002 and its expected effect on world oil prices and global oil supply heightened the sense of urgency over energy security within China's leadership. [35] Taken together, the above developments seemingly place China on the edge of, if not already in the middle of, an energy crisis. [36]

Yet, this atmosphere of crisis may be a blessing in disguise. It serves to highlight the country's vulnerabilities to domestic and international energy supply systems and thereby awaken the Chinese leadership to the enormity of the challenges facing the country. Consequently, energy security is now firmly at the top of the leadership's domestic and foreign policy agenda and has prompted the government to tackle some of the issues related to the institutional arrangements of the country's energy industry.

Importantly, the government has had another go at strengthening the policy-making functions of China's energy institutions. In May of 2005, the

Chart 2 Structure of China's energy institutions after 2005



State Council issued Document No. 14 that established a State Energy Leading Small Group (LSG), which is headed by Premier Wen Jiabao with the assistance of two Vice Premiers – Huang Ju and Zeng Peiyan – and is comprised of 13 top leaders from the country's major ministries and administrations. This is the first time since 1993, when the Ministry of Energy was dissolved, that a central body has been inaugurated to be in charge of China's overall energy policy. The State Energy LSG, however, does not meet on a routine basis. To support its routine work, the central government subsequently set up a 24-member State Energy Office, headed by Ma Kai, head of NDRC, and aided by Ma Fucai, former general manager of CNPC.[37]

In addition to restructuring the country's energy policymaking system, the central government also shored up the regulatory power of the State Electricity Regulatory Commission (SERC). Although the SERC was created to regulate the power sector, the authority over electricity price-setting resides with the NDRC. Under this system, SERC has been very weak. With the power shortages of 2004, China's leadership is convinced the NDRC alone is not able to deal with China's cyclical energy crises. As a result, the government has recently clarified the functions between the SERC and NDRC, with the former responsible for regulating and issuing permits to conduct business operations in the power sector and the latter governing review and approval of power projects. The NDRC must also consult with the SERC before adjusting electricity prices nationwide.

Breaking the Back of Monopolies

There has also been a concentrated effort to dilute the monopolies enjoyed by China's major oil companies, with the aim of boosting their domestic and international competitiveness and their ability to secure the country's oil security. To accomplish this, the central government has blurred the lines of business and operation. For example, offshore E&P was previously dominated by CNOOC, but in 2004 CNPC and Sinopec received authorization to operate in the South China Sea and East China Sea. In a similar fashion, CNOOC has made forays into onshore development, which was once the sole purview of CNPC and Sinopec.[38] With similar motivations, the government has also encouraged all state-owned oil companies to become fully integrated companies – similar to major international energy companies. The downstream sector was traditionally dominated by Sinopec and CNPC, but CNOOC has made

inroads here as well by starting the construction of a refinery in Huizhou, Guangdong Province. Exclusive international oil trading rights held by CNPC, Sinopec and Sinochem ended in May of 2004 when CNOOC won authorization to import oil. This ended the irony that CNOOC had to sell its equity oil on the international market. Similarly, both CNPC and Sinopec are starting to make forays into the LNG business, which was formerly dominated by CNOOC while Sinochem received authority to invest in overseas upstream acquisitions in 2001.

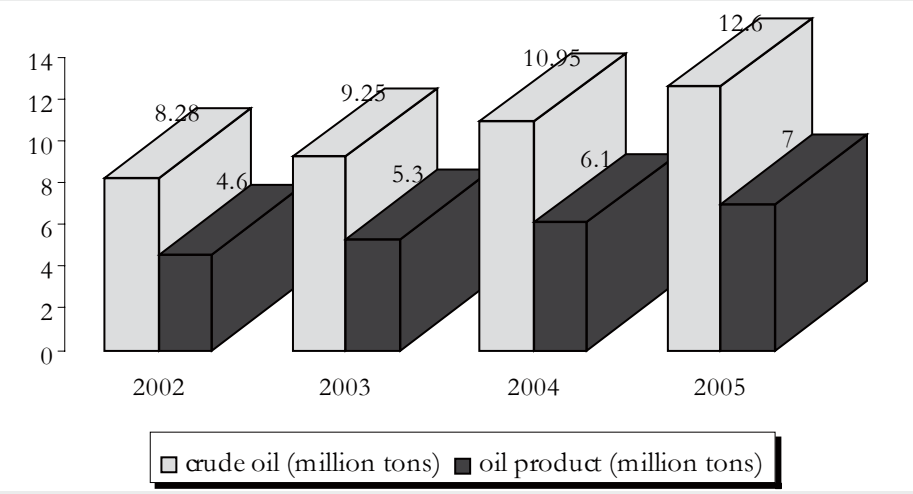
> The energy crises of the past several years may be a blessing in disguise as it serves to highlight the country's vulnerabilities to energy supply.

China also began seriously opening its domestic oil market both to honor its WTO obligations and to increase the number of competing players to secure oil for the country. To these ends, deregulations took place in three areas. First, the central government increasingly relaxed restrictions on non-state owned oil companies, granting them import quotas for oil and oil products for the first time in 2002. Since then, they have imported 8.28 million tons of oil and 4.6 million tons of oil products raising their share of these imports by 15 percent.

The central government has also opened the retail market of petroleum products to foreign oil companies, paving the way for some of the largest foreign investments in China's domestic energy industry. Many international concerns have responded to this new policy with plans to open thousands of gas stations jointly with China's oil majors. Statistics show that BP, Exxon Mobil, Shell and Total SA have all been approved to set up 3,600 gas stations altogether in cooperation with Sinopec and CNPC in northern China as well as in the Jiangsu, Zhejiang, Fujian and Guangdong provinces. [39]

The upstream oil and gas sector is gradually being exposed to private investment as well. On Feb. 24, 2005, the central government issued the report, "Opinions of the State Council on Encouraging, Supporting and Guiding the Development of Private and Other Non-Public Economic Sectors." [40] This is the first policy document to promote the development of private enterprises in this sector since 1949 and it marks the important step toward rectifying the irrational circumstance in China where domestic capital is disallowed from investing in certain areas where foreign capital is allowed. More importantly,

Chart 3 Imports of oil and oil product by non-state owned oil companies since 2002 in China[41]



it granted private capital the right to conduct oil E&P and mining. To echo this new round of deregulation in the energy sector, the Great Wall United Petroleum Company (GUPC), China's first independent oil group that represents more than 30 domestic privately-owned oil firms, was formed on June 29, 2005.

Finally, the energy shortages have led to progress in risk management. The central government has both promulgated detailed contingency plans and established a State Contingency LSG under SERC to deal with potential massive blackouts. [42/43] Similarly, perceived threats to oil supply and price stability have also quickened the government's pace to create mechanisms to reduce risks to the country's oil security by approving and initiating construction of four SPR cites in Zhenhan, Zhoushan, Dalian and Huangdao. Furthermore, a fuel oil future exchange was set up in the fall of 2004 to better manage the negative impacts of price fluctuations.

Whither China's Energy Institutions

The latest efforts by the central government to restructure both the energy policy making system and the energy markets should be lauded as constructive change, but neither move has fundamentally tackled the real hurdles

to greater energy security. Of the highest priority is the enduring lack of decisive leadership with the energy institution in China. Although headed by two premiers and including top leaders from 13 ministerial agencies, the State Energy Leading Small Group (LSG) is not a true policymaking body. Instead, its primary tasks are to research a national blueprint for an energy strategy including energy development, conservation, emergency systems as well as international cooperation within the energy sector. It also provides consultation to the State Council for policy formation.[44] Clearly, under this mandate, the LSG and its acting agency, the State Energy Office, is more of a high-level research group and advisory council than a driving force in energy policymaking. With the absence of such a body, the existing problems of fragmentation and compartmentalization will continue to plague China's energy institutions.

One radical solution to this paramount issue would be to reestablish a powerful Ministry of Energy. However, several major factors would invariable work against this option. At a minimum, the redistribution of power and resources that would result in establishing a new energy ministry would incur formidable resistance by the 13 parallel ministerial organizations and the mighty state-owned energy companies. This reality alone effectively makes establishing such an institution a non-starter. Even if it did go through, chances are that some form of accommodation would likely be necessary with these two bureaucracies as well as local governments, making the ministry a mere symbolic head at best or, at worst, further fragmenting the policymaking architecture. Conversely, if concentrating the authority over coal, oil, gas, and power into one administrative body was successful, the energy ministry could become a super-institution with unprecedented power. Given the incomplete deregulation of the energy sector, such a body may only increase heavy-handed administrative intervention, thus further hindering the country's energy security. Hence, before these issues are sorted out, reestablishing the Ministry of Energy in the current environment will remain a distant and perhaps inadvisable option.

Without a powerful policymaking body, the existing problems of fragmentation and compartmentalization will continue to plague China's energy institutions.

Alternatively, incremental change to the existing institutional arrangements is feasible. The government should clearly delineate energy policy making,

implementation, and industry regulatory functions. Since reestablishing an energy ministry in the short term is very unlikely, the government should transform the State Energy LSG into a full-fledged national policymaker rather than a consulting body. This may be feasible if Premier Wen Jiabao instills it with sufficient political leadership and helps facilitate coordination between the 13 relevant parallel ministries and their energy portfolios. The success of the State Energy LSG requires formalizing its agenda and instituting frequent meetings on a minimum quarterly basis to decide on long term national development goals and energy security. Implementation can be carried out by existing institutions with the State Energy Office responsible for fulfilling long-term energy strategies, and the Energy Bureau responsible for overseeing short-term energy policies.

While policymaking authority should remain concentrated at the central level, regulation can be delegated. In addition to SERC, the country needs regulatory commissions for all other sectors of the energy industry, including oil, natural gas, coal, nuclear power and renewable energy sectors. The Energy Bureau can reduce its administrative burden and let these regulatory commissions supervise the country's energy market and deepen the country's energy market liberalization. This will not only allow the Energy Bureau to focus on project review and project approval but also prevent the energy market regulatory bodies from being captured by the country's powerful energy industry.

However, further restructuring is necessary before these independent regulatory commissions can function effectively. Foremost in this regard, the central government must reclaim the regulatory power that was previously transferred to the powerful state energy companies and local governments. This problem is clearly demonstrated by the regulatory capture CNPC and CNOOC have over cooperation with foreign oil companies for onshore and offshore E&P. In an attempt to protect their own turf, these companies are often reluctant to open exploration plots to foreign interests and as a result obstruct not only badly needed foreign investment but also slow domestic energy production. Other facets of this irrational, anti-competitive system are currently manifested. CNPC and Sinopec recently obtained some offshore acreage for E&P. However, offshore development requires a partnership with a foreign oil company. Based on China's regulations, CNOOC remains the sole official partner for foreign companies to develop China's offshore resources. [45] Consequently, neither CNPC nor Sinopec has made significant headway in exploiting their offshore acreage.

Whether China reforms the regulatory or policymaking institutions, the Chinese government must expand the personnel and resource capacity of China's energy governance. Currently, at the national level, less than 170 people are working to solve the enormous energy challenges for a population of 1.3 billion people.[46] Undoubtedly, this is a recipe that all but guarantees failure. An immediate and substantial increase in the number of staff members working on the country's energy policy, particularly the staff level at the Energy Bureau, is long overdue.

The central government should also take steps to reduce administrative controls, market monopoly, price distortions, and import quota in order to

The Environment Imperiled

In 2003, a bitter struggle ensued over the building of a series of dams in the middle and lower reaches of the Nu River in Yunan Province. The State Environment Protection Agency (SEPA), the designated central institution tasked with protecting China's environment vigorously opposed the project based on broad environmental concerns against powerful private power generation interests backed by local governments. This case brought to light a number of debilitating institutional problems with regard to safeguarding China's environment.

At the central level, SEPA is forced to cooperate with other ministries on environmental issues. As a result, the agency often cannot decree a stop to projects that fall short of its environmental standards and are approved by other ministries. To further complicate this conflicting institutional climate, SEPA's national authority is undermined by its limited authority over offices at the local levels. Local bureaus answer only nominally to national SEPA because they are required to report to a separate vertical system under the control of local governments. This is largely because local governments decide both the personnel and budget of the local bureaus of the SEPA. Not surprisingly, as the latter is beholden to the local governments for their wages, facilities, career growth and benefits, they are rather powerless. A natural dilemma arises for all local SEPA bureaus when projects with environmental protection issues compete with local employment and economic growth.

foster an institutional environment conducive to the country's energy security. Although private investment has been welcomed in the domestic oil and gas sectors since early 2005, administrative controls by state-owned oil companies have so far blocked any significant private participation. A case in point is the failure of the Great Wall United Petroleum Company, China's first private oil group, to acquire a permit to engage in exploration, wholesale, retail, and import of crude/oil products. Consequently, GUPC has become merely a figurehead. By contrast, state-owned energy companies enjoy exclusive oil and gas exploration rights, controlling 99.6 percent of the country's total exploration acreage. Unfortunately, stewardship over these precious resources by state companies is critically flawed. In a 2003 annual review of the 875 exploration projects controlled by state companies, 45 percent did not receive the required minimum investment and 36 percent received no investment at all. [47] Therefore, the government should strictly stipulate that all energy development projects that do not receive minimum investment be subject to auction on the market and permits awarded to private oil companies that have enough capital and technology.

The Chinese government must expand the personnel and resource capacity of China's energy governance.

Private domestic oil companies should also be actively encouraged to join the 'go out' campaign by investing overseas. This will simultaneously boost the country's oil supply and help to redress accusations targeted at China's state-owned oil companies for their controversial investment strategies. To accomplish this, the government will need to gradually eliminate import quotas and regulation barriers to private interests.

Finally, the government should further strengthen the country's energy risk management mechanism. The development of the strategic petroleum reserve is an urgent goal and one to which private oil companies can contribute. An expansion of the country's futures market from its present narrow coverage of fuel oils to a broader platform including crude oil would help China manage risk to price instability. Additionally, in the long term the government can look to closer collaboration with the International Energy Agency to tap into its risk management mechanisms.

Energy institutions manage and regulate the complex components of the country's energy industry. Unfortunately, the configuration of that body has largely constrained the country's ability to meet the challenges of cyclical power

shortages, oil insecurity, and environmental degradation. The size and path dependent nature of the energy bureaucracy makes any revolutionary reform to China's institutional culture difficult, and perhaps, impossible. Incremental change is possibly the only hope for China's system. Alternatively, energy crises may be the only viable stimulus to push reform of China's energy institutions through to completion. While restructuring of these institutions may be doubtful, it will be absolutely vital to the nation's energy security. Thus far, China has muddled through and may be lucky enough to avert an energy crisis without deep institutional reform. But that would be betting on an unacceptably uncertain future.

Notes

[1] Energy Information Administration, "International energy outlook 2006," U.S. Department of Energy, Washington, D.C., Jun. 2006, p. 83.

[2] Although there are some excellent studies on the evolution of institutional arrangements in China, they fail to explain the effect of energy institutions on the country's energy security. Several examples of the previous studies include: Philip Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, *International Energy and Resources Law and Policy Series,* The Hague, *London/New York: Kluwer Law International*, 2004; Michael E. Arruda, "China energy sector survey Part II: The energy institutions," *China Law & Practice,* Dec. 2003/Jan. 2004; Leland R. Miller, "In search of China's energy authority," *Far Eastern Economic Review 169*, No. 1, Jan./Feb. 2006; Jimin Zhao, "Reform of China's energy institutions and policies: Historical evolution and current challenges," in *BCSIA Discussion Paper 2001-20, Energy Technology Innovation Project,* Cambridge, MA: Kennedy School of Government, Harvard University, 2001.

[3] Zhang Kang, Zhou Zongying, and Zhou Qingfan, *The Development Strategy of China's Oil and Gas,* Beijing: Archeology Press, Petroleum Industry Press and China Petrochemical Press, 2002, pp. 487-90.

[4] For a detailed account on the reforms of China's energy institutions, see: Zhao, "Reform of China's energy institutions and policies: Historical evolution and current challenges."

[5] Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, p. 27.

[6] Ibid., chapter 12.

[7] These five power-generating companies include China Datang Corporation, China Huaneng Group, China Huadian Corporation, China Guodian Corporation, and China Power Investment Corporation. The two grid companies are State Grid Corporation of China and China Southern Power Grid. Sinohydro Corporation, China Gezhouba (Group) Corporation, China Power Engineering Consulting Group Corporation and China Hydropower Engineering Consulting Group Corporation are the four services companies.

[8] Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, p. 27.
[9] "The State Power Corporation of China reorganized into 11 companies", *China.org.cn*, Dec. 29, 2002, See: http://www.china.org.cn/chinese/2002/Dec/253844.htm.
[10] Wang Qingyi, "China's coal industry: Its evolution and prospect (Part 2)," *China Coal* 27, No. 2, 2001, p. 8.
[11] Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, p. 181.
[12] The Editorial Committee of China's Energy Development Report, *China's Energy Development Report,* Beijing: China Metrology Press, 2003, p. 109.
[13] "The power over coal prices will be completely deregulated and the ordering pattern will fade out", *xinhuanet.com*, Dec. 17, 2005, See: http://news.xinhuanet.com/fortune/2005-12/17/content_3933969.htm.
[14] For how the operation of small coal mines affect the accuracy of China's energy statistics, please refer to Jonathan E. Sinton, "Accuracy and reliability of China's energy statistics", *China Economic Review*, No. 12, 2001. Jonathan E. Sinton and David G. Fridley, "Comments on recent energy statistics from China", *The Sinosphere Journal 6*, No. 2, 2003.
[15] For a background on the 14 reorganizations of Chinese government, please refer to "Government restructurings since new China was established", *xinhuanet.com*, Mar. 4, 2006, and Mar. 6, 2006, See: http://news.xinhuanet.com/zhengfu/2003-03/04/content_756385.htm and http://news.xinhuanet.com/zhengfu/2003-03/06/content_761540.htm.
[16] The most important example is the multiple restructurings of China's national energy planning institution. The State Planning Commission (SPC) was established in 1952 with the charge of China's strategic energy development and regulating the energy industry. It was split into the SPC and the newly instituted State Economic Commission (SEC) in 1956, with the former still in charge of the country's long-term planning and the latter implementing the country's annual energy targets. However, the SPC regained its former power in 1988 by a merger with the State Energy Commission in 1993, only to lose both its energy industry regulatory power and its responsibility for implementing annual planning targets to the State Economic and Trade Commission (SETC) in the massive government restructuring of 1998. This new organization was renamed the State Development and Planning Commission (SDPC), but was reorganized into the National Development and Reform Commission (NDRC) in 2003 and won back its regulatory power over the energy industry when the SETC was dissolved in 1998. Also, the NDRC shares its authority with SERC, which performs some of the regulatory functions in the power sector.
[17] For more about path dependence in institutional change, see: North, *Institutions, Institutional Change and Economic Performance*, chapter 12.
[18] In his article on the energy institutions in China, Michael Arruda touched upon the responsibilities and functions of some the 12 institutions. See: Arruda, "China energy sector survey Part II: The energy institutions." But his list is far from complete. For the official description of the responsibilities and functions of different ministries of the Chinese government, please refer to Zhongguo Zhengfu Wang (the official website of

the Central People's Government of People's Republic of China), See: http://www.gov.cn/wsfw/index.htm.

[19] Xiong Wenzhao and Zhang Wei, "Prevent the compartmentalization of China's national policy", *The Outlook Weekly*, 2006, See: http://news.sohu.com/20060521/n243333237.shtml.

[20] For a special coverage on fuel tax, please refer to a collection of reports carried by China5e.com, See: //202.114.65.37/KNS50/download.aspx?filename=CCBH0206.GMRB20020325Z327&tablename=CCND2002&dflag=pdfdown.

[21] Ding Ningning, The Experience and Lessons of China's Government Restructurings since its Economic Reform, *Guoming Guancha Kan*, May 28, 2006, See: http://guancha.gmw.cn/show.aspx?id=8349.

[22] Bo Kong, "An anatomy of China's energy insecurity and its strategies", *Pacific Northwest National Laboratory, Seattle: Pacific Northwest Center for Global Security*, 2005, p. 23.

[23] For more on how major players in China's energy industry use their excessive power to manipulate the country's reforms in the industry, see: Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, chapter 10.

[24] For reasons why power shortages in China are defined as cyclical energy insecurity, see: Kong, "An anatomy of China's energy insecurity and its strategies", pp. 3-6.

[25] Ibid., for a more detailed account of how the recent power shortages affected the Chinese economy.

[26] "Electricity shortage in 2004: 30 percent natural disasters and 70 percent human errors", *xinhuanet.com*, Dec. 22, 2004, See: http://news.xinhuanet.com/stock/2004-12/22/content_2366867.htm.

[27] Sinton, "Accuracy and reliability of China's energy statistics", and, Sinton and Fridley, "Comments on recent energy statistics from China."

[28] The power over coal prices will be completely deregulated and the ordering pattern will fade out", *xinhuanet.com.*

[29] Ibid.

[30] At present, the retail and wholesale price of oil in China is based on the weighted average of prices in New York, Rotterdam and Singapore. The retail price is set at 5.5 percent higher than the wholesale price (which is allowed to fluctuate +/- 8 percent after the retail price is fixed). Lan Xinzhen, "Prospecting the local oil market", *Beijing Review*, May 17, 2005, See: http://www.bjreview.com.cn/En-2005/05-17-e/bus-1.htm.

[31] By some estimates, for every ton of refined products it sells, Sinopec loses 230 yuan ($28.75 USD). Zuo Xiaolei, "Institutional costs cause losses-Pros and cons of the $10 billion subsidy to Sinopec", *china5e.com*, 2006.

[32] In April 2004, CNOOC and Sinopec established a joint venture (CNOOC-Sinopec International Trading Limited), whose quota was increased. "CNOOC obtains the right to import 12 million crude oil per year", *china5e.com*, 2004, See: http://www.china5e.com/news/oil/200406/200406210245.html.

[33] "Electricity shortage in 2004: 30 percent natural disasters and 70 percent human errors". For a detailed study of how the recent power shortages affect China, see: Kong, "An anatomy of China's energy insecurity and its strategies."

[34] Author's calculation based on statistics from General Administration of Customs of People's Republic of China.
[35] Li Yige, "The suspense of the U.S. War against Iraq: Will the 70,000 barrels of oil be shipped to China safely?", *People's Daily* online edition, Feb. 19, 2003, See: http://past.people.com.cn/GB/Jinji/20030219/926361.html.
[36] In fact, some analysts and media in China already characterized the recent energy pinch in China as an "energy crisis." However, others objected to this characterization and maintained that it exaggerated the seriousness the recent energy shortages in China.
[37] For detailed information about Office of the National Energy Leading Group, please visit its official website: http://www.chinaenergy.gov.cn/index.php?id=1.
[38] For example, recently the local government of Inner Mongolia agreed to allow CNOOC to develop its resources. For more, see: "Inner Mongolia signed an agreement with CNOOC to develop and utilize resources", *China Land & Resource News*, July 12, 2004, See: http://www.clr.cn/frontNews/chinaResource/read/news-info4.asp?ID=25383.
[39] Lan Xinzhen, "Prospecting the local oil market", *Beijing Review*, May 17, 2005.
[40] "Opinions of the State Council on encouraging, supporting and guiding the development of private and other non-public economic sectors", *Xinhua News Agency*, Feb. 25, 2005, See: http://news.xinhuanet.com/fortune/2005-02/25/content_2616929.htm.
[41] Based on data published by China's Ministry of Commerce.
[42] "Circular on establishing State Emergency Leading Small Group to deal with massive blackouts", State Electricity Regulatory Commission, July 15, 2005, See: http://www.serc.gov.cn/opencms/export/serc/bulletin/tongzhi/news/tongzhi000013.html.
[43] "Authorized release: State Contingency Plans to deal with events of massive blackouts", *Xinhua News Agency*, Jan. 23, 2006, See: http://news.xinhuanet.com/politics/2006-01/23/content_4090776.htm.
[44] "Wen Jiaobao heads the newly established State Energy Leading Small Group", *People's Daily*, May 30, 2005, See: http://politics.people.com.cn/GB/1026/3426700.html.
[45] Based on "Regulations of the People's Republic of China on the exploitation of offshore petroleum resources in cooperation with foreign enterprises", promulgated by the State Council on Feb. 10, 1982. Also see: "The Decision on revision of the regulations of the People's Republic of China concerning the exploitation of offshore petroleum resources in cooperation with foreign enterprises", Decree No. 318 of the State Council, Sept. 23, 2001.
[46] 170 people includes 16 people on the State Energy LSG, 24 people at the State Energy Office, 30 people with Energy Bureau, and 98 people with SERC.
[47] "What is behind the Gas Shortages?", *China Land & Resource News*, Jan. 20, 2006, See: http://news.mlr.gov.cn/frontNews/chinaResource/read/news-info4.asp?ID=77317.

Energy Conservation as Security

Wang Qingyi

Redefining Energy Security

"Energy security" is usually defined as the guarantee of a stable and reliable supply of energy at reasonable prices. However, this definition is often misleading because it equates oil supply as the primary focus of a country's energy security considerations. As a developing country with a limited natural resource endowment China does not rely on oil alone. Instead China is one of the few economies in the world that still uses coal as one of its main sources of energy. Therefore, energy security in China is more comprehensive because it must consider the supply of coal, gas, electricity and nuclear energy along with oil imports.

In addition to resource supplies, a country's energy security also depends on a number of domestic and international factors. Energy prices and the circumstances of the international energy market are important external elements. The degree of an economy's dependence on energy, a country's contingency capacity including strategic reserves, standby production capacity alternatives for energy substitution, energy efficiency and technical capacity are all key domestic considerations for a nation's energy security. In these broad terms, China's energy security is unquestionably more fragile than many developed countries. Consider the basic fact that in China, the maintenance

Wang Qingyi *has worked in the State Planning Commission and was vice president of the China Energy Research Society. In addition to serving as an expert in the China Coal Information Institute he has also consulted for the Asian Development Bank and the World Bank on China's national energy and conservation. Wang is the author of numerous books including* China's Energy, *and the annual publication,* Energy Data.

China Security, Summer 2006, pp.89 - 105
©2006 by the World Security Institute

of social and economic development requires higher energy intensity than in developed nations. End-user expenditure on energy in China accounts for 15.7 percent of GDP, while the figure is only 7 percent in the United States.[1] Reducing both the direct and indirect (externalities) expenses of China's energy mix can only come from serious conservation measures.

Table 1 China's Energy and Key Economic Indices[2]

	1990	2000	2005
Year-end population (millions)	1143.33	1267.43	1307.56
GDP (billions of U.S. dollars)	232	1118	2279
Per capita GDP (U.S. dollar)	204	886	1743
Primary energy consumption (million tons coal equivalent)	987.0	1385.5	2224.7
Per capita energy consumption (kilogram coal equivalent)	863	1093	1701
Power output (trillion watts)	621.2	1355.6	2474.7
Steel output (million tons)	66.35	128.50	352.39
Net oil import volume (million tons)	-23.46	74.00	143.61
SO 2 emissions (million tons)	14.95	19.95	25.49

Energy conservation is the most realistic and economical approach for China to achieve a viable energy security. Research shows that the net costs of wind energy, hydropower and nuclear power as programs for reducing fossil fuel use and corresponding CO_2 emissions are 6.1, 6.2 and 7.0 times more than energy conservation.[3] There is huge potential to make large efficiency gains using energy conservation and therefore it must be the priority of an energy security strategy. In the 11th Five-Year Plan (2006-2010), the Chinese government has committed to bring the country's overall energy intensity down by 20 percent.[4] This would effectively make it the most ambitious energy conservation program in the world. As energy conservation is vital to China's energy security, it is important to understand how the government is faring in achieving its goals and whether these goals are indeed realistic.

The Inevitability of Demand

Much ink has been spilt over analyzing the nature of China's economy and how it will be fueled in the future. There is little doubt that China's demand

for energy will rapidly increase in the foreseeable future. [5] Yet, understanding the structure of its energy consumption patterns is crucial in order to create effective policy prescriptions to improve energy efficiency and to promote conservation. Structural changes in industrial production have been the primary reason for China's rapid increase in energy demand. Beginning in the early 1990s, China entered a new round of heavy industrialization. Heavy industry comprised 66.5 percent of China's total industrial production value in 2004; up from a level of 50.6 percent in 1990. [6] Notably, the energy consumption per unit of production value (energy intensity) in heavy industry was four times higher than the intensity for light industries.

> The structural change in China's energy demand lies primarily in the rapid acceleration of urbanization and people's consumption patterns.

The reason for this fundamental shift lies primarily in the rapid acceleration of urbanization throughout the country and the attendant changes in people's consumption patterns. The rate of population migration from the rural areas to the cities is unprecedented in human history. From 1978 to 2004, China's urbanization rate rose from 17.9 percent to 41.8 percent, increasing the total urban population from 170 million to 540 million. [7] Equally staggering is that the current per capita energy consumption in China's cities is three and a half times more than in the countryside (a disparity that is far higher than in developed countries).[8] Compared to their rural counterparts, urban dwellers demand more living space, more automobiles and more home appliances, all of which entail highly energy-intensive industries.

In addition, China is expending an enormous amount of energy in its role as "factory of the world." China produces one-third of the world's computers and refrigerators, one-half of its textiles, digital cameras and DVDs, and 60 percent of the air conditioners, microwave ovens and copy machines bought around the globe. The huge demand in the domestic and international market for Chinese goods drives the rapid growth in the output of products requiring high energy-consuming industries. The benefits of becoming the world's primary manufacturer are offset by the costs of the staggering consumption of both energy and other commodity resources. In 2003, China burned up 32 percent of the global aggregate coal output, 26 percent of global steel

output, 25 percent of its copper and aluminum and 40 percent of the world's cement.[9]

Looking to the future, as urbanization and the structural upgrading of consumption look set to continue for a very long time, China's output of high energy-intensive products will only continue to grow. As a result, a vast rise in China's demand for energy will simply be unavoidable. Several forecasts predict that by 2020 China's primary energy demand will be between 3,300 and 3,700Mtce or between 1.5 and 1.7 times its demand in 2005.[10]

Energy Efficiency Floundering[11]

Since the reform and opening-up, China has actually made great strides in energy conservation in an effort to address escalating consumption. Between 1980 and 2000, China's annual GDP growth averaged 9.7 percent, while primary energy consumption grew by only 4.6 percent annually, giving an energy consumption elasticity coefficient of 0.47. Given the strains of "middle industrialization" (period of rising heavy industry in economy), this is actually a remarkable achievement. Yet, since 2002, China's energy conservation rate has deteriorated. That is, energy demand has been increasing faster than China's GDP growth, reversing the trend of its declining energy intensity and leading to a jump in its energy consumption elasticity to 1.6 between the years 2003 and 2004. While this may be a temporary abnormality, it could nevertheless be a signal that the role of structural energy conservation is weakening.[12]

In the first place, there is a phenomenal waste in China's energy production. The overall efficiency of the energy sector stands at a mere 11 percent. In other words, only slightly more than a tenth of the recoverable energy reserves are converted into end-usable energy, while almost 90 percent of it is lost or wasted in exploitation, processing, conversion, transportation, storage and end utilization process. Such low efficiency of the energy sector translates into higher energy end-product expenditures. For instance, the average cost of China's domestic oil refinery production was 30 percent higher than that of their foreign competitors.[13]

Secondly, energy efficiency in China remains very low despite the overall progress in conservation over the past decades. Currently, domestic energy intensity is about 50 percent higher than that of other developing countries with similar conditions. China also continues to lag far behind advanced

country levels of energy efficiency, especially within energy-intensive product industries. In 2004, coal consumption per unit in China's fossil fuel power plants was 20.5 percent higher than developed country levels, for steel-making it was 15.6 percent higher and for cement-making it was 23.3 percent higher.[14]

In 2004, the average energy consumption index of 16 products within seven of China's industrial sectors (power, steel, non-ferrous metals, construction materials, petrochemical, chemical and light industries) was 40 percent higher than that of the world's advanced economies. This situation is due in large part to the low energy efficiency of general-purpose equipment used in these industries. For instance, the average operational efficiency of small and medium-sized electric motors in China is 87 percent, while the figure is 92 percent in the United States; for coal-fired industrial boilers it is between 60 and 65 percent in China, while the figure is over 75 percent abroad.[15]

The energy efficiency of buildings in China is also egregiously low. Surveys of residential structures with heating in Beijing, Tianjin and northeast China reveal the average amount of energy consumed per heating unit is 24.2 kgce/m^2, or 3.9 times that of Germany, which has similar climate conditions.[16]

As China's rising middle class seeks to purchase more cars, fuel efficiency standards will significantly impact the country's energy consumption patterns. But here too, China lags behind in fuel economy. Currently, the average oil consumption for all automobiles is more than 20 percent higher than developed nations, while for light trucks China's is over 25 percent higher. [17]

Structural Potential

Energy conservation is simply the effort of lowering energy intensity for any socially or economically productive activity. However, the range of tools to improve conservation goals can include economic, technological, legal and administrative methods, as well as publicity and education, while their availability and effectiveness depend on the particular cultural, socio-economic and political conditions of a nation.

Structural shifts in the economy are extremely important elements in energy conservation because they have both the potential to cause significant shifts in energy intensity and because there is an inherent incentive to implement structural improvements: energy costs and dependence on energy can

be alleviated. Structural factors entail the make up and scale of the industrial sector, enterprises, as well as product composition, energy mix, and even the structure of trade (import and export of energy-intensive products).

Industrial structure adjustments in the economy mainly involve moving from heavy industry to higher technology and service sectors that require less energy intensive activity and have higher added-value. The energy intensity of China's business sector is merely one-fifth of the average of heavy and light industries. Improving the structure of economic production requires developing new energy-conserving, environment-friendly construction materials, high concentration fertilizers and the like. Adjusting energy structure means shifting domestic energy consumption from coal to higher efficiency energy such as electricity, gas and steam. All developing nations face these structural challenges and their implementation that, although vary in difficulty, are relatively straightforward.

Enterprise structure, however, is more unique to China. The evolution of China's enterprises has been instrumental in leading the country during the early stages of China's rapid economic growth of the past 20 years. In the initial stages of reform, many small and medium sized enterprises sprang up in villages and townships around the country as they were more versatile and adaptive to taking advantage of the rapidly changing policy and market environment of the moment. Many of China's energy-intensive and highly polluting enterprises belong to this group of smaller scale enterprises. Within the energy intensive industrial sector, small industries use 30 to 60 percent more energy per output than larger-scale enterprises.[18] Unfortunately, the former produce the majority of output of these energy-intensive items. Surveys show that smaller scale industrial enterprises account for some 50 percent of the total energy consumption of China's entire industrial sector.[19] These enterprises continue to use backward production techniques and high energy-consuming raw materials, all of which are exacerbated by their lower level of technical equipment and management methods. For example, in 2004, the average annual pig iron (raw iron) output of blast furnaces in China was 750,000 tons, while in Japan the figure was 2.83 million tons. There are as many as 5,027 cement factories in China, with

The energy intensity of China's business sector is merely one-fifth of the average of heavy and light industries.

a mean annual output of a mere 190,000 tons. By comparison, the figure is 1.14 million tons in Japan. The challenges in altering the production and energy consumption patterns of these enterprises are formidable. Many of them have deep political and economic relationships with local governments

Table 2 International Comparison of the Enterprise or Facility in Energy Intensive Industry (2004)[20]

Category	China	Foreign
Coal Mines	28,000 with average annual output of 70,000 tons	9 in Germany, average annual output of 5.56 million tons
Refineries	56 with annual processing capacity of 4.19 million tons	6 in South Korea, annual processing capacity of 21.47 million tons
Blast Furnaces	263 with average annual steel production of 750,000 tons	29 in Japan, annual steel production of 2.83 million tons
Cement Factories	5,027 with an average annual output of 190,000 tons	65 in Japan, average annual output of 1.14 million tons

and interests, making their behavior difficult to substantively change, let alone consolidate or close them down.

During the first two decades of China's rapid economic reform (1980-2000), structural energy conservation accounted for approximately 70 percent of total energy conservation.[21] However, between 2003 and 2004, the energy conservation rate (rate of decrease in energy intensity) has turned negative, a rather rare phenomenon. This is most likely due to the excessive growth in production of energy-intensive industries such as steel, cement and aluminum, yet it holds the possibility that structural energy conservation is declining. This would be extremely unfortunate, since in the long run, there remains potential for huge gains in structural energy conservation.[22]

Accelerating technological innovation clearly brings substantive drops in energy consumption per unit output. There are numerous examples of China's development in advanced science and technology. To name a few, China has independently designed and manufactured 600MW supercritical pressure units, [23] 320kVA (kilo Volt-Ampere) roasters for aluminum processing, [24] and new high-volume pre-heaters for the cement-making process. In 2005, high-efficiency electric light sources accounted for over 50 percent of the total of electric lighting.[25] Yet, only 30 percent of China's energy conservation

achievements from 1980 to 2000 were the result of technological progress illustrating - in stark relief - how much room remains for these advances to achieve big leaps in China's energy conservation.

The Policy Report Card

Research by the World Bank has shown that 'market forces' only contribute to approximately 20 percent of energy conservation. [26] This is primarily because there are substantially more 'market obstacles' and fewer economic incentives to achieving permanent energy conservation gains than for instance, increasing energy supply through development projects. The latter is largely responsive to market mechanisms such as price, quantity and technological innovation. For energy conservation, on the other hand, the role of the market is constrained because markets and prices tend to represent short term profits but do not sufficiently reflect long term benefits and potential. As a result, energy conservation is generally unattractive, especially with investors only willing to make a minimum investment. In addition, the market fails at incorporating the impact of environmental degradation in the cost of energy consumption, thus negating an important incentive to changing consumption behavior and promoting conservation.

The government is therefore essential to overcoming negative externalities like environmental degradation and can do so through managing energy conservation such as using energy-efficiency standards, tax and funding incentives, energy audits, market regulation and research and development initiatives. However, this brings us to the one of the biggest obstacles facing the promotion of energy conservation: institutional weakness. Already more than 10 years ago, the government set out the guidelines on energy policy that put conservation on a par with resource development, even making the former a priority. Yet, it is clear this goal is far from being realized.[27]

Agencies

While market-oriented reforms in China have pressed forward in the past decade, energy conservation work has noticeably retreated. The government administration for energy conservation has been losing a significant amount of its personnel since 1992 and nearly all economic incentive policies arising from it have been abolished.[28] With recent energy shortages, these institu-

tional shortcomings are all the more glaring. In comparison with areas such as power and fossil fuels, the investment in energy conservation is anemic. Set alongside similar agencies in other market economies, there is an urgent need for reform of this government body. Take the United States for example. In 2003, the Office of Energy Efficiency & Renewable Energy (under the Department of Energy) had a staff of 450 and a budget of $1.3 billion. Japan's equivalent bureau had 65 employees and a budget of $400 million. [29] China has only a handful of people working on energy conservation with a fraction of the budget. [30]

A case in point of the negative effect of administrative and regulatory inadequacy is the current status of China's Energy Conservation Law, promulgated in 1998. Approximate evaluation suggests that only 6 percent of its articles have been implemented sufficiently, 60 percent have been poorly implemented and 34 percent have not been implemented at all. [31] One article within that law covering energy conservation design standards for buildings has been adopted by roughly 15 to 20 percent of new buildings in cities and towns in China. It is urgent that the Energy Conservation Bureau is reestablished and the system of an executive energy conservation meeting of the State Council resumed. Government officials at all levels should greatly strengthen their abilities in comprehensive decision-making, coordination and administration of energy conservation.

Investment

Reducing the growth of energy consumption has been shown through research to be highly dependent on the amount of investment put into energy conservation. In 1983, 13 percent of total energy development investment went into energy conservation. That figure fell to 4 percent in 2003. Lowering energy consumption levels to half of GDP growth would take an estimated 10 times the investment of current levels.[32]

Investment in technological innovation is probably the most important factor in altering energy conservation levels. In China, there are very few R&D funds available for energy conservation technology. Enterprises are usually the main source of innovation, yet this remains small to non-existent in many sectors of the economy. One survey conducted by the Ministry of Science and Technology reveals not only is enterprise R&D funding in China far below

their developed economy counterparts, a mere 2 percent of the latter's total R&D funding went to energy conservation.[33] In similar fashion, a negligible 0.66 percent of enterprise expenditures went to new product development.[34]

Government R&D in energy conservation is equally deficient. It invested a total of 609 million RMB ($73 million USD) on energy R&D, with an estimated 10 percent of that going toward energy conservation. [35] This figure pales in comparison with others, such as the United States and Japan. They spent $557 million and $559 million respectively on energy conservation, comprising 23.8 percent and 15.7 percent of their respective total energy R&D funding. [36]

The lack of funding and policy oversight goes beyond economic constraints. It is an attitudinal issue as well. If the government is to make any dent in energy conservation technology innovation, it must significantly increase funds for energy conservation R&D, guide and encourage enterprises to develop energy conservation technologies and promote the publication and dissemination of research results.

Incentives

China's fiscal and tax reform of 1994 effectively undermined many of the incentives for the promotion of energy conservation that were built into previous policies. [37] The adverse effect on conservation has been grave indeed. Government support is vitally important in overcoming the many obstacles to energy conservation that currently exist in all the processes of the product life-cycle and in all actors relevant to energy conservation. This government action comes mainly in the form of financial and tax policy incentives and can be divided into several categories. The first category is comprised of those policies that promote energy conservation by lowering its investment cost such as financial allocations, tax reductions or exemptions and preferential loans. Another group entails measures that increase the cost of energy consumption, for example energy and environmental protection taxes. A third purview of government action comes in strengthening market signals by managing prices that reflect an accounting of various externalities. Taken together, these government tools are essential components for managing energy demand, implementing voluntary conservation agreements and energy audits of companies and promoting energy efficiency standards.

One of the most useful measures at the government's disposal is a variety

of levies and/or exemptions that curb consumption of fuel or encourage energy efficiency. The main goal of highway transportation tax is both for energy conservation and environmental protection. A suitable level of fuel oil tax plays an important role in oil conservation. In 2003, the U.S. gasoline fuel oil tax was only 11 percent of the British rate, while the average daily oil consumption per person in the United States was 2.6 times that of Britain.[38] The European Union levies vehicle tax by engine power and encourages consumers to buy small displacement cars. In 2005, to encourage the development of high-efficiency and clean automobiles, Japan lowered the vehicle

Failing to Set an Example

If a government has any role in being a model for energy conservation, then China's is doing a poor job. Defined as all administrative institutions, enterprise activities, and social organizations that fall under the auspices of the state, the Chinese government encompasses approximately 50 million persons. This is a bureaucracy on a grand scale and, unfortunately, it also wastes energy on a grand scale.

In 2003, the government's per capita use of energy, and of electricity in particular, was 7.6 and 10.9 times higher, respectively, than China's urban per capita energy consumption. In the same year, energy consumption by the Chinese government was recorded at 63.35 million tons of coal and 91.1 billion watts of energy, an amount that surpassed the total energy consumed by China's 800 million rural population. These levels of energy consumption are also far higher than other governments. In one comparison, for example, the government of Australia's New South Whales province is 2.3 times lower than that of China's.

Rather than have society's highest rate of energy consumption, the government should strive to be a model for energy efficiency, or at the very least, no more wasteful than the citizens it governs. It has the means and responsibility to be an exemplar in the implementation and organization of energy efficiency and conservation policies as well as follow its own mandate of purchasing energy efficient products and technologies. The Chinese government has yet to meet that challenge.

tax by 25 percent to 50 percent for new automobiles that meet fuel economy and emission standard targets set for 2010. For those who buy hybrid power or fully electric automobiles, the government offers subsidies as high as 50 percent of the price difference between these automobiles and conventional gasoline automobiles. [39]

As a second example, energy pricing management is also a powerful instrument of the government to promote energy conservation. The basis for improving energy efficiency in the economy remains using the price of energy to fully reflect the total cost of energy; that is, allowing the supply and demand relationship to function properly. Under these conditions, energy price and energy conservation are directly linked: constant energy prices may lead to improvement in efficiency but will also lower energy expenses thereby increasing demand; on the other hand, a rise in energy price will reduce demand and promote R&D of energy conservation technology. [40]

Energy efficiency can also be effectively enhanced using standards labeling. An example of this activity is the 'Energy Star' label adopted by the U.S. government, which it supported with $35 million in 2001. [41] Expanding the market share of energy-saving products through the lowering of market barriers is another method of promoting energy efficiency. The governments of 40 different states and utility companies subsidized customers with $63 million for purchases of various home appliances. In California, a subsidy was implemented in the amount of $75 to $125 per refrigerator, $50 per air conditioner and $75 per washing machine, if they met energy-saving standards.[42]

The basis for improving energy efficiency in the economy remains using the price of energy to fully reflect the total cost of energy.

Economic incentives can come from a variety of sources including the government budget, energy companies, energy conservation funds and international cooperation projects. Thailand has set up one of the world's largest energy conservation funds, totaling $5 billion, through various means including levies on oil products. [43] The fund promoted energy efficiency through labeling, demand side management and voluntary agreements. During the 1980s, China established several national energy conservation special funds, which offered preferential interest rates for technology innovation, but they were all abolished by 1998. [44] Currently, there is a dire lack of government administra-

tion funds for energy conservation. Most of the major conservation projects rely on international cooperation. While some international cooperation projects have achieved good results, they are not sustainable without robust domestic incentive policies.

Information

Implementing effective energy conservation policies requires a comprehensive understanding of China's increasingly complex energy consumption patterns. This encompasses statistics and data coverage as well as accurate indexing, all of which are particularly deficient at the present time.

Other information regulation and services should be provided including public campaigns, information networks, education and consulting services. Guiding companies to execute voluntary energy audits have been highly effective in other countries and this practice should be aggressively adopted in China. Both the U.S. federal and state governments and the Japanese Ministry of Economy, Trade and Industry provide small- and medium-sized enterprises with free energy audits. Through energy auditing, U.S. industrial enterprises have reduced their electricity consumption by 2 percent to 8 percent. Power companies provide energy audit services for energy conservation in residential houses, with an average energy conservation rate of 3 percent to 5 percent.[45]

A Change of Heart Needed

Energy conservation provides a crucial framework for understanding China's energy security strategy. In order for this to become a reality, however, a fundamental shift in how the nation perceives energy consumption and conservation is necessary. During the era of the planned economy, energy conservation was thought of as bridging the gap between energy supply and demand. Quota setting and price fixing were used to coerce people to conserve energy during shortages and thereby bring demand in line with supply. However, once those energy deficiencies were met and the crisis ended, conservation measures were relaxed, and previous consumption levels reappeared. The result was that following a period of energy scarcity, a phase of increased energy consumption was effectively causing a reversion to low energy efficiency.

Although such policies act to curb demand-side behavior, they do not place the decision-making in the hands of the consumer. Rather, the thinking underlying this planned economy strategy, much of which still exists today, effectively puts the emphasis of energy consumption levels and conservation on the supply and development of energy. In other words, it stresses the need for increasing supply rather than decreasing consumption. The reasons for this are complex, but a key element is that as long as the monopolistic energy companies and the government have a deeply integrated relationship, the management of energy supply will trump control of energy demand. Such companies, focused on supply and development, will naturally have countervailing interests to energy conservation and efficiency.

Altering this reality will require a fundamental shift in attitude of the government and its energy administration from predominantly pursuing supply quantity through energy exploitation and production to expediting conservation through economic and market mechanisms. The International Energy Agency states that, "the supply and demand relationship in the energy system is not determined primarily by energy supply, trade or energy markets but by end energy services." This transformation cannot be accomplished solely through technological, policy and institutional improvements, but also requires profound changes in people's values. This is particularly relevant to China, whose consumption behavior has yet to catch up to the realities of China's energy situation. Enforcing energy conservation would stir a revolution that will truly change the landscape of China's energy consumption and hence its energy security.

Notes

[1] U.S. Department of Energy, "Comprehensive national energy strategy [DOE/S-0124]," Apr. 1998. See: http://www.pi.energy.gov/pdf/library/cnes.pdf.

[2] Joint Research Team: State Environmental Protection Administration, National Development and Reform Commission, UNDP and the World Bank, "Problems of and countermeasures for greenhouse gas emission control in China," Dec. 1994.

[3] "Communiqué of the Fifth Plenary Session of the Sixteenth Central Committee of the CCP," *Xinhuanet.com*, Oct. 11, 2005. See: http://news.xinhuanet.com/politics/2005-10/11/content_3606215.htm.

[4] See: China National Bureau of Statistics, General Administration of Customs and State Environmental Protection Administration. The net oil import volume of 1990 does not include liquefied petroleum gas, paraffin, and petroleum coke or petroleum

asphalt. Dollar amounts based on 1 USD = 8 RMB, not on exchange rate of the time.

[5] Wang Qingyi, et al, "Energy efficiency and energy conservation," *Research on National Energy Comprehensive Strategy and Policy of China*, Economic Science Press, 2004, pp. 321-358.

[6] National Bureau of Statistics of China, *China Statistical Yearbook 2005*, Beijing: China Statistics Press, 2005.

[7] Zhou Qun, Lin Yanhua, "China's urbanization encounters 'urban disease'," *Chinanews,* Nov. 11, 2005. See: http://www.chinanews.cn//news/2005/2005-11-18/14441.html

[8] Shan Hongqing, "Problems on developing heavy and chemical industries," *Petroleum & Petrochemical Today*, No.12, p. 12, 2004; and Guo Yuntao, "Challenges faced by coal mining industry in the age of heavy and chemical industries," *China Energy*, No.8, p. 35, 2004; Wang Qingyi, et al, "Energy efficiency and conservation," *China Energy Development Strategy and Policy Research*. Beijing: Economic Sciences Press, 2004, p. 379.

[9] Jin Renqing, "Timely implementation of sound financial policies," *People's Daily*, Feb. 22, 2005.

[10] U.S. Department of Energy, *China Energy Outlook 2002*.

[11] Wang Qingyi, "International comparison of unit energy consumption of energy-intensive products in China and its implications," *International Oil Economy*, 2006, No.2, pp 24-30.

[12] Ibid; Zhu Chengzhang, "Putting energy efficiency into effect," *Energy Conservation and Environment Protection*, 2006, No.4, p. 39.

[13] Wang Qingyi, "Ten issues regarding energy conservation in China," *China Energy*, 2005, No.5, pp. 15-23.

[14] State Grid Corporation of China; China Iron and Steel Association; China Building Materials Industries Association; China Chemical Energy Conservation Technology Association; *Journal of the Japan Institute of Energy*, 2004,No.8; Institute of Energy Economics, Japan, *Handbook of Energy & Economic Statistics in Japan 2005*.

[15] Li Aixian, Qian Xiuying (ed.), *China's Conservation Potential and Policies Regarding Key Consumption Products,* Beijing: China Statistics Publication House, 2004, pp. 107.

[16] National Central Heating Boiler Network, "Heating energy consumption investigation report during the ninth Five-Year, 2001," *Dieter Eschenfelder*, 2001.

[17] State Economic and Trade Commission/United Nations Development Program/ Global Environment Facility, "China end-use energy consumption efficiency project," *Transportation Energy Efficiency*, No. 9, 2002.

[18] Energy Research Institute of National Development and Reform Commission (NDRC), *Survey of energy consumption situation for Chinese middle and small-size enterprises*, 2004.

[19] Wang Qingyi, "International comparison of unit energy consumption of energy-intensive products in China and its implications," *International Oil Economy*, No.2, 2006, p. 26.

[20] Notes: (1) Chinese blast furnace represents large and middle-scale steel companies; (2) The numbers of blast furnaces and cement factories in Japan are from 2003 data. See:

China National Coal Association, *Glückauf Magazine*, No. 6, 2005; *Oil and Gas Journal*, Dec. 20, 2004; China Iron and Steel Association; *Journal of the Japan Institute of Energy*, No. 8, 2004.

[21] Feng Fei, "Energy supply structure during the eleventh Five-Year Plan and in 2020," *Reform*, No.4, 2005, p.8.

[22] Wang Qingyi, "International comparison of unit energy consumption of energy-intensive products in China and its implications," *International Oil Economy*, No.2, 2006, pp. 24-30.

[23] *Economic Daily*, Mar. 17, 2005.

[24] Ibid.

[25] Annual Survey Report on China's Green Lighting Engineering Promotion Project, 2005.

[26] International Institute for Applied Systems Analysis, "Soviet Union's energy difficulties and prospects," *Annual Review of Energy and the Environment*, 1991.

[27] Wang Qingyi, "Ten issues regarding energy conservation in China," *China Energy*, No.5, 2005, pp. 15-23; Wang Qingyi, "Transforming government functions is the key to energy conservation," *Energy Conservation and Environmental Protection*, No. 2, 2006, pp. 13-14.

[28] Wang Qingyi, "Ten issues regarding energy conservation in China," *China Energy*, No.5, 2005, p. 17.

[29] Wang Xiuli, "Energy conservation measures by China and other countries," *Water and Electric Power Technology*, No.4, 2005, pp. 20-21.

[30] Research Team, *Research on Government Energy Conservation Administration Mode in Market Economy*, Beijing: China Electric Power Press, 2004. See: http://www.eren.doe.gov/eere.

[31] Wang Qingyi, "Ten issues regarding energy conservation in China," *China Energy*, No.5, 2005, p. 17.

[32] Ibid.

[33] Ma Chi, etc., "Researches on Chinese Energy R&D Input," *International Petroleum Economics*, No. 4, 2003, pp. 37-40.

[34] Xue Xiaohe, "Sci-tech agencies are coal taches for the transformation of technological achievements. An interview with Professor Jiang Dianshui, director of Beijing Zhongke QianFang Biological Technology Research Institute," *Economic Daily*, Oct. 31, 2005.

[35] Ibid.

[36] International Energy Agency, "Energy policies of IEA countries," *2001 Review OECD/IEA*.

[37] Fu Zhihua, "The status quo and development of China's fiscal policies," May 2005. See: http://www.efchina.org/documents/FuZHH_CNEN.pdf.

[38] The Institute of Energy Economics (Japan), *Handbook of Energy and Economics Statistics in Japan*, 2003.

[39] Wang Qingyi, "Ten issues regarding energy conservation in China," *China Energy*, No.5, 2005, p. 22.
[40] Price elasticity coefficient is defined as the percentage drop in demand per 1 percent rise in price. For example, in the United States if the price of gasoline rises by 20 percent, demand would fall by 7.6 percent, assuming a price elasticity coefficient of 0.38. See: Wang Qingyi "Ten issues regarding energy conservation in China," *China Energy*, No.5, 2005.
[41] Energy Conservation Training Program to United States by U.S. Department of Resource Conservation and Comprehensive Utilization, the Former State Commission of Economics and Trade, "U.S. energy conservation policies and administrative pattern and their implication for China," *Energy Conservation and Environmental Protection*, No. 9, 2003, p. 9.
[42] Ibid.
[43] Shi Jianhua, "Fiscal policy measures by foreign countries to support energy conservation and their applications," *International Taxation in China*, No.10, 2004, p. 52.
[44] Wang Qingyi, "Ten issues regarding energy conservation in China," *China Energy*, No.5, 2005, p. 22.
[45] Ibid.

Politics vs. Market

Mao Yushi

As China's demand for energy grows, so does its dependence on imported oil. Currently, over 40 percent of China's total oil consumption derives from foreign sources making a supply disruption of the oil import routes an unthinkable blow to its national economy. Oil supply security has thus become the contemporary imperative and has raised a number of critical questions. Will oil be used as a weapon against China by exporters? Will a shortage or undersupply of oil resources lead to energy wars between China and other major importers such as the United States and Japan? Politicians and scholars must think hard about these critical issues.

Shifting Landscape of Resource Competition

Since ancient times, competition over resources has been a cause for conflict. In the Han Dynasty, the Hsiung-Nu frequently invaded the central plains of China during harvest seasons for the purpose of acquiring grain and livestock. Land (one form of a resource) was also the object of intensive struggle leading to wars. Even people were seen as a resource during the slave era. All such conflict was common until the second half of the 20th Century.

Mao Yushi *was most recently the director of the Unirule Institute of Economics. Previously, he worked at the Chinese Academy of Social Sciences and has been a visiting scholar at Harvard University. In November 2004, Mao was elected by the International Business Review as one of the ten most influential economists in China. He is widely published on energy and environmental economics, transportation, policy reform and poverty alleviation.*

China Security, Summer 2006, pp.106 - 115
©2006 by the World Security Institute

To take one stark example, the island nation of Japan has historically been in urgent need of a range of resources such as coal, iron and grain to sustain its development. Japan's invasion of three northeast provinces in China was essentially a war to capture these and other resources that were abundant in the area.

However, this situation has slowly been transformed following World War II. With global economic integration, resources can now be distributed across world markets. Countries and companies that badly need resources can freely acquire them on the commodity markets. War and killing over resources has been rendered unnecessary. Taking Japan as an example once again, it remains a resource-poor country, yet it has achieved the status of a world economic power. It purchases all vital resource and energy needs. With the fast pace of economic development over the past few years, China's demand for resources has increased dramatically, many of which have been successfully acquired through market transactions. A globalized market infrastructure has been established and no one country should be willing to pay the price of war to acquire resources.

Countries and companies that badly need resources can freely acquire them on the commodity markets.

Naturally, not everyone is in agreement with this assessment. Many believe that as resource shortages intensify, the competition over energy will eventually develop into war. The American occupation of Iraq is often cited as a decisive example supporting this line of thinking. However, the popular argument that the United States wishes to control and takeover Iraq's oil resources for its own benefit is entirely out of touch with reality. In truth, the U.S.-Iraqi war is purely a conflict of ideology motivated by a sincere moral loathing of Saddam Hussein for being, from their perspective, a dictator. President George W. Bush has articulated the goal of annihilating all tyranny in the world. This drives closer to the heart of the current risk of war, at least between the United States and certain regimes. Wars of ideology have replaced wars over resources.

This is not to say disputes over possession of energy resources do not exist. The United States, Japan, Germany and all oil importing countries, including China, are competing for the use of oil. Yet there has been no threat of violent conflict as competition has thus far been resolved through market

mechanisms. Ideally, this will continue and there will be no war as long as the market governs the distribution of energy worldwide. Oil will be sold to whoever offers the higher price.

Exceptions to the Rule

Yet, a fundamental problem remains that not all resources in all regions have entered the market. A case in point is the East China Sea, where China and Japan struggle over the rights to exploit the sea's gas fields. Will war break out as a result of competition over them? It cannot be ruled out entirely because there are other factors at play, including territorial jurisdiction, sovereignty and national pride. Concessions on territory, sovereignty and national dignity are difficult to make for any country (let alone for China and Japan, two nations with a difficult history). This is the stuff of politics, about which politicians and even ordinary citizens may find impossible to compromise. The problem is that while many bilateral issues do not originally involve elements of sovereignty or dignity, they are often introduced when politicians get involved, complicating negotiations.

However, it is unlikely that a conflict will break out between China and Japan over the oil and gas resources in the East China Sea. The reason is simple: resource development is profitable and these interests are more likely to hold sway in the end. Dividing the benefits between buyer and seller, between importer and exporter is a win-win situation. When negotiations fail, both sides suffer. If there is war, the cost will far outweigh any gain to a country and its commerce. Business people are universally pragmatic and will by no means turn a potentially profitable situation into a loss for both sides. Through mutual concessions a deal can always be reached without politicians calling for war.

Exporter Dependence

The market operates under its own rational principles. Buyers and sellers need each other; neither can exist without the other. This relationship is very firmly established within the law of supply and demand. It is usually observed that energy-dependent countries see oil as their lifeline and any supply disruption will immediately throw their economy into chaos. Yet, the other side of the supply-demand equation is all too often underestimated. Petrol states

are equally reliant on energy exports. Oil revenues are indispensable to their economies, providing a source of enormous foreign exchange to buy grain, medical equipment, vehicles, and accessories as well as salaries for civil servants. Oil is virtually their sole source of revenue and thus, whether they like it or not, they are guided, even decisively constrained, by the laws of economics. It is because the oil industry is a far easier economic endeavor than just about any other resource that many petrol states rush to exploit these resources and even become addicted to them. Unfortunately, the temptation is powerful for them to let their oil industry thrive while neglecting other sectors at their own peril. In the event that exports are interrupted, resource-based economies would likely collapse immediately.

This author once asked a professor of Fahd University in Saudi Arabia how long his country could sustain imports with its foreign exchange reserves if its oil trade was interrupted. His answer was a maximum of three months. Such states are arguably more fearful of being unable to export oil than energy-dependent states are of supply disruption. Without external influences, an equitable deal forged by both sides cannot conceivably encounter major obstacles. In this scenario, there is no possibility of oil-exporting countries using oil as a threat against oil-importing countries. Oil supply is therefore secure by any rational calculus.

Politics Distort the Market

This analysis is also evidenced in historical fact. The global political arena has always been marked by change and turbulence. Yet, whether one looks at periods of high geopolitical tension or intervals of cooperation, the energy market has never been discontinued. During the Cold War, the former Soviet Union exported natural gas to Europe virtually unimpeded, and following its dissolution, Russia continued to supply gas to Europe. Despite a change in leaders and one might say, regime ideology, Russia's commercial energy contracts have never encountered any fundamental problems.

Given these facts, why is there so much sound and fury over oil supply security? The recent example of Russia attempting to halt the supply of natural gas to Ukraine is a case in point for analysis. First, the low cost supply of gas from the former Soviet Union to Ukraine was never based on a commercial exchange but rather a political deal. In 2005, Russia supplied Ukraine with gas at $50 per thousand cubic meters while it supplied gas to Western Europe at

a price nearly five times that amount ($240 per thousand cubic meters). The lower price of $50/tcm of gas was entirely unrelated to the market price and merely due to Ukraine's status as a republic of the former Soviet Union. This relationship is a legacy from a time when the Soviet Union still utilized a planned economy and price did not fulfill any real economic function but was more symbolic.

Even today, Russia continues with differential treatment to the former Soviet republics in terms of the price of natural gas it supplies. In principle, the price is low for those republics politically close to Russia and high for those politically close to the United States. Recently, Ukraine has shown a notable trend toward autonomy from Russia, triggering Russia's decision to issue a warning. In addition, Belarus' behavior of late has also been viewed as unacceptable by Moscow leading to a disruption in its gas supply. The right-wing government in Poland is presently in the planning stages to build a gas pipeline from Norway to eliminate its dependence on Russia. The root cause of all such disputes is that politics has penetrated the market. The natural gas contract between Russia and Western Europe is closer to a purely commercial contract. Each party needs the other based on unfettered economic principles. Without the involvement of politics, this relationship has remained surprisingly sound.

Petrol states are arguably more fearful of being unable to export oil than energy-dependent states are of supply disruption.

In a fair market, prices are consistent across the panoply of buyers and sellers. Fundamentally, it is not possible for a seller to sell at a higher price or a buyer to receive a lower one. To gauge whether a commodity's price has been established through competition, one can simply check whether there is a unified price across the market. The value of foreign exchange, gold, oil and grain are all established by the international market each day. Price equilibrium is in turn an essential condition for optimum resource allocation. Take for example the current gap in oil and gas prices between countries. The price of Russia's exported gas has up to a 500 percent difference between countries (this does not include the price of its domestic gas, which is even lower). This phenomenon is certainly not an outcome of market competition and makes such trade of gas very unreliable. Furthermore, oil prices within oil-export-

ing countries are significantly below market value. This has been extremely detrimental to the effective utilization of resources. When oil is scarce, as it is today, such huge waste deserves special attention.

The Rational System

In the past, when China exported its oil, international prices far exceeded domestic prices, and domestic and international markets were entirely segregated. Following the adoption of reform policies, China's domestic crude oil prices began to merge with international levels, yet finished oil products continued to be controlled. Although world oil prices have gone up recently, China's domestic price for finished oil products has remained low causing many domestic oil refineries to operate at a loss. As a result, smuggling of petroleum products has become rampant as domestic demand exceeds supply. Such price-setting policies are highly unfavorable for the rational allocation of resources and lead to significant waste.

To secure energy supplies, China is fostering good relations with many oil producers, including Russia, Kazakhstan, Nigeria and Venezuela. Meanwhile, it is also competing with high energy demand countries such as Japan and India. For instance, the proposed construction of a pipeline from Russia to Daqing in Northeastern China involved many 'extra-market' activities because of China's competition with Japan. To secure oil supply from Africa, China often agrees to provide economic aid alongside energy contracts. Chinese leaders have increased their diplomatic visits to Africa, in part because of oil. However, the use of political influence to compete for oil supply is always dangerous as there are no permanent friends or enemies in politics. Using political alliances to seek secure oil supplies is a powerful tool but also very unwise. Consequently, the only reliable method to ensure China's energy security and that of the rest of the world is to maintain political neutrality when reaching agreements through business negotiations on the basis of fair competition and market mechanisms.

The United States criticism of Russia for wielding oil and gas resources as a political tool is with good reason. Russia sells oil at prices often divorced from market levels, which is proof that oil is used as a means for political ends. The Organization of Petroleum Exporting Countries (OPEC), on the other hand, trade most of their oil at international market prices. During his

recent visit to China, OPEC's chairman clearly stated that the group's goal as an economic organization is to make maximum profit. While this may sound harsh and calculating in an environment of high energy prices, it should come as a comforting and even a wise statement that dampens the negative psychological elements of tight demand and supply of the energy markets.

The commercial basis for oil supply is, above all, to privatize the energy industry, which will rationalize the transactions of oil resources on the market. China has sought far and wide to acquire secure oil supplies through oil equity on the international market. Yet, when it comes to China's own domestic petroleum resources, there is little open trading as this sector is monopolized by state-owned enterprises (SOE). SOEs are often poorly managed and suffer from low efficiency and other deficiencies that are very difficult to correct. Therefore, privatization of the natural resources sector is the best path to rationalize the distribution of resources. If resources are traded and their ownership changes according to market rules, it will be possible to allocate them to those sectors that most need them. Privatizing energy resources will prevent politicians from using oil resources for purposes of political expediency, a phenomenon which increases the uncertainty of supply. Private businesses are thus directly faced with higher and more varied risk that can even lead to bankruptcy. Nevertheless, they are best suited to avoid such risks through increasing efficiency, restructuring and optimizing allocation of resources. This is not only economically rational but also increases the supply of resources.

The use of political influence to compete for oil supply is always dangerous as there are no permanent friends or enemies in politics.

Having been educated under a system that puts the state in a superior position, ordinary people in China will have great difficulty in accepting these changes quickly. Even the United States, where resources are owned privately, has had doubts when it comes to mergers and acquisitions of international energy companies. Governments impulsively seek to maintain ownership over key resources because they believe that doing so provides a greater measure of control over national security and the state can thus better serve the public interest. There is often the belief that in privatizing development of such resources, the public interest itself would be privatized and national security jeopardized. However, there is little evidence to support this notion. It must

be realized that the sole purpose of natural resources are their means as a tool to serve the economy, and it is the market that can most efficiently distribute such resources. Political control, on the contrary, invariably distorts the allocation of resources because its possession of them is often connected to the personal gains of politicians, or as a means to achieve power. As for the concerns about profiteering by private entities, this can be fully corrected by vigilant and robust tax regimes.

A Place for Politics

So what role do politics and policies have in securing a reliable energy supply? They can protect market mechanisms, foster global economic integration and implement the World Trade Organization's free trade rules without exception, and regulate all trading practices to comply with the principle of open market exchange. Unlike safeguarding a territory, which has clearly defined borders, protecting the market is about defending a series of intangible economic rules. Put simply, prices rise when supply is short and they fall when there is an oversupply; buyers look for sellers who offer the lowest prices; and sellers look for buyers who offer the highest purchase price. These market forces are impersonal. Buying and selling is based on price, not on any extraneous characteristic of the buyer or seller. Frankly, it is economically impossible for oil to not be purchased. One may not want to acquire a resource because the price is not high enough to make a profit. The corollary is that it is impossible for oil not to be sellable; it is only possible that the price is not low enough.

In light of this, China and Japan do not have to compete for Russia's natural gas. Even from the perspective of supply security, the result is the same regardless of who acquires it. If Japan prevails, it will no longer need to purchase natural gas elsewhere and China can take up the slack somewhere else in the market. Similarly, if China buys Russian natural gas, it will not pose a threat to Japan's ability to acquire that energy source elsewhere.

However, while market-oriented commodity trading can ensure supply security, it cannot ensure price stability. Prices change as the supply and demand situation changes. This is quite necessary. If prices remained unchanged and the scarcity of resources was not reflected in price, the world would fall into chaos. This is the most fundamental tenet of economics.

A Threat to the Market Overcome

As mentioned above, with the impetus of global economic integration, it is highly unlikely that there be wars over resources in the future, though a few possible exceptions exist. Such exceptions are most likely to occur when a weak, resource-rich country confronts a powerful country, in which the latter may not hesitate to start a war to seize the resources of the former, even if there are no political motives such as territorial expansion or hegemony. From the cost-benefit perspective alone, such a possibility exists.

One recent example is the first Gulf War when Saddam Hussein invaded Kuwait. The purpose of the war was, chiefly, to obtain oil. The cost of the war was low because Kuwait was small and militarily weak. Had no one intervened to halt this invasion, it would have become a global disaster, as it would have destroyed the fundamental market principle of price as the principle arbiter of supply and demand rather than force. This instance demonstrated that military might could be employed to secure resources thus altering the rules of resource allocation. As it happened, Saddam's brazen aggression was arrested by the United Nations. The United States deployed its army to drive the Iraqi army back. Saddam's error brought disaster on the Iraqi people and Saddam himself and even today, the country has not recovered from its predicament. On the other hand, the rules of an open market system have been further fortified and a similar event is unlikely to occur in the future.

China's Role

Until recently, China has been an economically weak country. Its share of the world market was very small and China was essentially a bystander of the global system. Now, however, the situation is significantly different. In 2004, the world's crude oil trading volume totaled 1.85 billion tons, with China accounting for 6.5 percent of it. The United States accounted for 27 percent and Japan 11.2 percent. In the iron ore and timber markets, China's share of global trading was even higher. China is rapidly transforming from an onlooker into a full-fledged participant. Such a change naturally grants China both more rights and more responsibilities in sustaining the world market. In the past, such rights and duties were undertaken by the countries with the biggest market shares, particularly the United States. China often sought to challenge this status quo. No more. China has a deep stake in protecting the global order, though its role as a key player has yet to be fully realized.

The global oil markets, particularly in the Middle East, along with their transportation routes, urgently need protection. At present, the United States assumes this role of guarantor almost exclusively. Undoubtedly, the U.S. deployment of aircraft carriers to safeguard the sea lanes of communication has greatly benefited Japan, Taiwan, New Zealand, as well as the Chinese mainland and India. But the political issues in the Middle East are fiendishly complex and cannot be undertaken by any one country alone. China has an important role to play by helping them achieve economic stability and improving people's lives. This is particularly true in Iraq, where the United States is in a crucial dilemma. If China helps build power plants, highways, ports, and transportation pipelines in a cooperative manner, not only will Chinese businesses possibly profit from the construction contracts, but it will bring social stability as well as increased oil production and exports. The United States should not oppose such acts, and would probably be grateful. Others in the region have problematic relations with the United States, while China enjoys greater acceptance by various governments. Why shouldn't China take full advantage of this by providing economic assistance to these countries? All of these issues are deeply integrated with oil security, and China should fully participate.

So, what is the most important task facing political leaders all over the world? It is to protect and sustain the global market. For without it, there will be no alternative to allocating global resources other than going to war.

Editorial Policy

China Security is an international and interdisciplinary quarterly policy journal dedicated to bringing diverse perspectives to bear on vital traditional and non-traditional security issues that impact China's strategic development and its relations with the United States and the region. The journal seeks to improve the understanding of China amongst American policy practitioners and the public by providing authoritative analysis on critical security issues.

China Security presents ideas from a wide range of intellectual traditions that cover both theoretical and policy-oriented research on political, social, economic and military issues relevant to China. As an independent journal, *China Security* provides a peer-reviewed forum for research publication that enhances the communication of concepts and promotes a creative dialogue within China and across national boundaries.

The articles in *China Security* do not represent any consensus of opinion. While readers may agree or disagree with the ideas presented in any one brief, it is our purpose to present a diversity of views rather than identifying with a particular body of beliefs. The analyses, interpretations and conclusions expressed in *China Security* are solely those of the individual authors and should not be attributed to the World Security Institute China Program, *China Security*'s Editorial Board or any individuals or organizations.

Manuscript Types

Analyses
These are referenced articles that provide analytical description of, and prescriptions for addressing, problems that represent a major challenge or trend in China. We welcome authors to provide new thinking about practical policy recommendations. We do not accept opinion pieces. Article length should be 3,000 to 7,000 words. We welcome papers written either in Chinese or English. Translated pieces will be subject to final review of the authors.

Book and Literature Reviews
Each issue also contains reviews of recently published books and other forms of literature (monographs and journal articles) on the topic area. These materials have been published in China, are written in Chinese and make an important contribution to the field.

Style and Content

The best guide to what we are looking for, in terms of both substance and style, is what we have already published. Prospective authors should start by examining current and recent issues of the journal. We rely on authors to ensure the veracity and originality of their statements. All articles should be supported with footnotes. Unless otherwise informed, we assume any article submitted to us is being offered exclusively, and that no article accepted for publication will be published elsewhere simultaneously in any form without our knowledge.

Edit/Review

All submitted manuscripts are first reviewed by the editors, and, whenever possible, responses given to authors within two weeks regarding initial acceptance of articles. Submissions of interest will be sent out for external review and authors will be notified for revisions within four weeks of submission. Papers sent back to authors for revision must be returned within two weeks. Acceptance is contingent on an author's submission of complete and consistent data, an accurate reference list, and conclusions consistent with results demonstrated in the study. Inconsistencies and inaccuracies found after acceptance may warrant return of the manuscript for resubmission. The decision to publish a manuscript is solely the responsibility of the editors and Editorial Board. *China Security* keeps the names of authors and reviewers confidential during the peer review process to ensure objective and fair assessment of submissions.

Call for papers

China Security welcomes unsolicited manuscripts and article proposals written in Chinese or English. Each quarterly issue of the journal focuses on a specific topic, but is open for submissions on other timely subjects related to areas of China's security. All articles should be supported with footnotes.

Submissions should be sent via email to:
publications@wsichina.org
or send to:

China Security
Editor
China Program
World Security Institute
1779 Massachusetts Ave. NW
Washington, D.C. 20036