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CHINA'S ENERGY EFFICIENCY DILEMMA: CHALLENGES IN ACHIEVING STATE MANDATED TARGETS FOR IMPROVED ENERGY USAGE

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Faced with rising energy costs, energy supply shortages and increasing environmental and health impacts from pollution, the leadership in Beijing appears to have reached a consensus on the need to improve the country's energy usage. This article explores four key challenges the Chinese central government will contend with as it aims to improve energy efficiency: the competing objective of economic growth, an array of agencies with overlapping responsibilities for energy policy, limited central government control over local governments, and a weak regulatory environment. Without addressing the underlying problems of policy enforcement, the extent to which China will be able to achieve its energy goals remains uncertain.

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INTRODUCTION

Recent analyses of Chinese energy security have focused on China's growing demand for oil (Zhao 2008; Zweig and Bi 2005). For observers outside of China, this focus may make sense as China's energy imports have a direct effect on world energy markets and have been one driver of the nation's foreign policy. Yet oil imports only accounted for an estimated 9.7 percent of Chinese energy consumption in 2006 (the most recent year's data available);¹ although historically high, they are only one small part of China's overall energy problem. Those concerned with Chinese security should instead look to the growing domestic demand for *all* types of energy and the government's approach to the pressing problem of energy efficiency.

The growing domestic energy demand has implications for the country's continued economic growth, the Communist Party's ability to remain in power, and Beijing's position in the international community. Recognizing the problems posed by such demand, including domestic energy shortages, harmful effects on both the environment and public health, and the threat that rising energy costs pose to businesses, the Chinese government has begun to address this issue by setting aggressive energy efficiency goals.

China's 11th Five Year Plan establishes a near-term goal of reducing energy intensity (i.e. the amount of energy required for every dollar produced in the economy) to 20 percent below 2005 levels by 2010 (Lewis 2007, 10). This goal is equivalent to saving 600 million tons of coal over the four-year period from 2006-2010 (Taylor et al. 2008, 145-146). Additionally, the regime's 2007 National Climate Change Programme directly called for an increase in energy efficiency and a reduction in energy consumption with a continued emphasis on economic development (National Development and Reform Commission 2007, 36).

While some of the savings in energy demand could come through structural changes to the economy, the World Bank estimates that at least half will need to come from improvements in energy efficiency (Taylor et al. 2008, 145-146). Although the leadership in Beijing appears to have reached a consensus on the need to improve energy efficiency and reduce energy use where possible, the same agreement does not appear to exist in terms of how to achieve those goals, due to four main challenges facing the central government:

- the competing objective of continued robust economic growth,
- an array of agencies with overlapping responsibilities for energy-related policy,
- limited central government control over local governments, and
- a weak regulatory environment.

While policies aimed at specific industries or sectors of the economy will likely be easier to achieve a consensus on, they represent the continuation of previously failed efforts to address energy use because they are prone to enforcement problems within an incentive structure that favors economic growth. Broader reforms that address the enforcement issue may be more difficult to reach agreement on and could threaten greater instability, the very condition

¹ Estimate calculated based on comparison of crude oil production and crude oil consumption figures for 2006 from the National Bureau of Statistics for China, *China Statistical Yearbook 2007*, (Energy: Figures 7-1 and 7-2), Available from: <http://www.stats.gov.cn/tjsj/ndsj/2007/indexeh.htm> [Accessed 1 December 2008]

the regime hopes to avoid. In order to more fully understand why the road to energy efficiency in China is so unclear, it is necessary to consider the arguments in favor of energy efficiency, the challenges of policy development and implementation, and the range of potential policy options the Chinese government could employ to meet its targets.

THE IMPETUS FOR ENERGY EFFICIENCY

Improving the country's energy efficiency is imperative if the Chinese Communist Party (CCP) hopes to achieve its three core policy objectives: preservation of its own political power, economic prosperity, and greater international power and prestige (Wang 2005, 19). Despite dramatic increases in coal production, mines are operating at or beyond design capacities, and power shortages have been experienced throughout the country (Ebel 2005, 64). Energy efficiency is therefore favored over other options due to constraints on the increased production and use of coal. Additionally, studies show that renewable sources of energy can only make a limited contribution to China's energy needs by 2020 when existing domestic coals supplies are expected to begin running out (Dadi 2005, 54). Improving energy efficiency may also be the most cost-effective approach to China's energy problems. Although efficiency improvement costs vary, they "often are only one-quarter to one-half the comparable costs of acquiring additional energy supply" (Taylor 2008, 28).

Furthermore, to maintain stability in China and thereby preserve its own position of authority, the CCP will need to address the problems of energy security and the harmful effects of pollution from energy sources. Erica Downs defines energy security in the Chinese context as "the acquisition of sufficient energy supplies to protect the Chinese leadership's core objectives at prices that are neither too high nor too low to undermine those objectives" (Downs 2006). Efficiency is needed to avoid greater future dependence on energy imports, which may leave China vulnerable to higher energy prices and supply disruptions. In 2004, China imported 2.5 million barrels of oil per day. Required oil imports will double to 5 million barrels per day by 2015 (Naughton 2007, 340). As previously noted, improved efficiency is also necessary to head off projected domestic coal shortages beginning in 2020 (Berrah 2007, 30); despite dramatic increases in coal production, mines are operating at or beyond design capacities and power shortages have been experienced throughout the country (Ebel 2005, 64).

The social discontent stemming from the harmful effects energy pollution is having on the population's health and the natural environment also poses a threat to the regime's power. China's dependence on coal for the majority of its energy has contributed to air pollution in the form of soot, sulfur dioxide and carbon dioxide emissions, contributing to poor health and environmental problems such as acid rain and greenhouse gas emissions (Xi et al. 2005, 307). The health effects of this pollution have been staggering. A 2007 study conducted jointly by the World Bank and the Chinese government found that there were 750,000 premature deaths each year caused by pollution-related respiratory diseases (Economy 2007). Civil discontent as a result of these conditions is a real concern for the Chinese government, so much so that the government was reluctant to release the findings of that same report "for fear of inciting social unrest" (Economy 2007). Government concern over public reaction to this type of data is not unfounded, as social unrest over the effects of pollution has been significant. According to Chinese officials, there were 51,000 pollution-related protests in 2005 (Economy 2007). Among

the leadership's greatest fears is "that its failure to protect the environment may someday serve as the catalyst for broad-based demands for political change" (Economy 2007).

Rapidly increasing energy demands and their effects also pose a threat to the regime's goal of continued economic prosperity. The pollution resulting from the increased use of carbon-based sources of energy is already negatively affecting China's economy. China's National Development and Reform Commission estimates "that environmental degradation and pollution cost the Chinese economy between 8 percent and 12 percent GDP annually" (Economy 2007). These costs manifest themselves in the form of health and productivity losses, as well as degradation of natural resources, but do not reflect the additional costs associated with brownfield clean-up (Naughton 2007, 493-494). In 2005, Pan Yue, the vice minister of China's State Environmental Protection Administration (SEPA), warned: "The [economic miracle] will end soon because the environment can no longer keep pace" (Economy 2007).

Improving energy efficiency will be crucial to ensuring the continued growth of the Chinese economy. Compared to other countries, China's per capita energy resources are quite limited. "[A]ccordingly, if China is to achieve a level of development and prosperity comparable to that in developed nations, energy efficiency levels in China need to be higher than developed countries" (Xi et al. 2005, 306-307). While China is still industrializing and urbanizing is the best time for it to act in order to avoid locking itself into an energy-intensive infrastructure and economy. Major developmental and societal choices can lock countries into narrow ranges of energy intensity for decades due to investments in major industrial equipment which lasts 30-40 years and individual energy use patterns becoming ingrained (Berrah et al. 2007, 12). Beyond the energy used by industry, economic growth will also lead to greater energy demands among consumers. A rapidly urbanizing population with rising incomes will use more energy. Individuals residing in cities consume an estimated 3.5 times more energy than those living in China's rural areas, and individuals with higher incomes demand improved housing and heating and cooling and are also more likely to own their own cars (Berrah et al. 2007, 48).

China's growing energy demand also threatens its desire for a more influential role in world affairs. China wants to be viewed as a responsible international player, but its poor environmental record, stemming largely from its energy production and use, has generated criticism from both international NGOs and foreign governments. Although China is a signatory to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, its status as a developing country exempts it from the emissions limits outlined in both agreements (Lewis 2007, 10). In 2008 China surpassed the U.S. to become the largest emitter of CO₂, and its emissions could continue to grow as much as 11 percent per year (Inman 2008). A concerted government effort to improve energy efficiency would demonstrate a good faith effort on China's part to address its energy problems and could help it win support from the international community.

International criticism has also focused on China's search for additional energy supplies. In order to secure access to oil, China has pursued relationships with countries such as Sudan and Burma, which are widely discredited for their human rights abuses. China's transactions with these regimes can be construed as support for them, and China faces pressure from international NGOs, such as the International Crisis Group and Human Rights First, as well as some foreign

countries to cut ties or at least scale back its relationships with such regimes. Although improved energy efficiency would not remove the need for foreign sources of oil, it might relieve some of the pressure China faces as it searches for additional energy supplies.

Recognizing the threat posed to both its domestic and foreign objectives, the Chinese government has introduced several policies over the last twelve years in an attempt to address the country's energy use. In 1997 the regime introduced the Energy Conservation Law, which initiated programs to increase efficiency in buildings, industry, and consumer goods. The 2005 National Renewable Energy Law set a target of producing 16 percent of China's primary energy from renewable sources by 2020, with a more aggressive 20% target for the electricity sector. This same law included financial incentives for developing renewable energy such as discounted lending and tax preferences (Lewis 2007, 10-11). And in 2006 the government established the 1,000 Enterprise Program to improve energy efficiency at China's 1,000 largest businesses, which accounted for 47 percent of industrial energy usage (Lewis 2007, 10). Yet these policies have not been entirely successful, and there is no reason to believe that the latest efficiency targets will be reached in China's current policy development and implementation environment.

The Chinese leadership's establishment of several targets for improved energy efficiency and reductions in energy use suggests its understanding of the country's need to improve its energy position in order to be able to continue to pursue its objectives of power, prosperity and prestige. However, the way in which China should go about reaching those energy targets is far less clear, as there seems to be little consensus among the central leadership. This inability to reach agreement is most likely due to the challenging policy development and implementation environment involving competing interests that put China's core objectives at odds with one another.

CHALLENGES OF ENERGY POLICY DEVELOPMENT AND IMPLEMENTATION

The central government faces four key challenges as it tries to meet its energy usage goals: the competing goal of economic growth, the lack of central government control over local governments, the number of agencies involved in energy-related policy, and the lack of a strong regulatory environment.

Competing Economic Growth Goals

The first hurdle the government will face as it tries to improve energy efficiency is the competing objective of near-term economic growth, which is attractive to businesses and political leadership alike. Just as the government has established aggressive goals for energy efficiency improvements, it has also set aggressive growth targets for the Chinese economy; Chinese premier Wen Jibao has set a goal of quadrupling the Chinese economy by 2020 (Economy 2007). Since the CCP ties its legitimacy as the ruling party to its ability to generate economic growth (Wang 2005, 32), continued economic development is crucial to preserving its power.

Despite the fact that improvements in energy efficiency will be necessary to ensure long-term economic growth and viability in China, the near-term rewards of growth are attractive and

could prompt companies and government officials to pursue greater production at the expense of more efficient production. Such competing objectives are not a problem unique to China; a recent World Bank study on how best to finance energy efficiency in developing countries observed that management in rapidly growing economies tends to favor growth in sales rather than production efficiency, despite the long-term benefits of investing in efficiency up front (Taylor et al. 2008,59-60).

Disconnect Between Central and Local Government Disconnect

A second problem in implementing energy efficiency measures is the limited central government control of provincial and local governments. In discussing the disconnect between the central and local governments, Shaoguang Wang writes: “The Chinese state is often viewed as a machine whose parts all mesh smoothly. In fact, the system of central control and coordination is largely a sham” (Wang 2003, 40). Lieberthal uses the term ‘fragmented authoritarianism’ to characterize the regime (Wang 2003, 40) and blames its inability to effectively implement environmental policy on two aspects of the relationship between central and local government: “the distribution of authority and the structure of incentives” (Lieberthal 1997, 3). These same factors seem to be equally important in understanding the challenges of developing and then enforcing energy efficiency policies.

In the early 1980s, the Chinese government adopted a policy of administrative decentralization that “moved a significant amount of appointive and monitoring power from the central government to the local governments” (Pei 2006, 147). This had the effect of fragmenting governmental authority in China “by function, by territory, and by rank” (Lieberthal 1997, 4). This system employs both vertical and horizontal lines of power that create serious problems in terms of policy implementation; under the system, “units of the same rank cannot issue binding orders on each other.” Therefore, a ministry at the center of the government cannot issue a binding order to a province (Lieberthal 1997, 3). Additionally, the number of administrative levels between policy formulation and implementation present the problem of “provid[ing] great scope for policy modification, inadequate implementation and direct obstruction” (Andrews-Speed 2004, 199).

This distribution of authority across levels of government in China also creates competing goals within the established performance incentive structure. In the case of environmental policy implementation, the structure of authority places policy enforcement directly under the direction of the same officials who are responsible for growing the local economy (Lieberthal 1997, 7). Under the current system, local officials’ performance is rated largely based on their ability to generate economic growth within their geographic area. Beyond performance ratings, economic growth is also critical for the day-to-day functioning of local government. Because they do not receive funding from the central or provincial governments, the township governments must raise their own operational funds, making them dependent on the profitability of the township enterprises (Lieberthal 1997, 5). This incentive structure has the effect of encouraging local officials to promote economic growth at the expense of other policies. There is an implied national political-economic deal that emerged during the reform period in which “each level of government will grant the level just below it sufficient flexibility to enable the lower level to grow its economy rapidly enough to maintain social and political

stability” (Lieberthal 1997, 4-5). This has established a norm whereby local officials pick and choose which policies they will implement.

Overlapping Bureaucratic Responsibilities

A third challenge to improving energy efficiency in China is the bureaucratic tangle of agencies involved in energy policy. Because policy development, implementation, and oversight authority reside in multiple agencies and bureaus, there is a lack of accountability and coordination within the central government. Responsibility for energy matters is divided across a number of ministry-level agencies. There are at least five different departments involved in the development of renewable energy resources, including “the State Development and Reform Commission, the State Economic and Trade Commission (now part of the Ministry of Commerce), the Ministry of Agriculture, the Ministry of Water Resources, and the Forestry Administration” (Xi et al. 2005, 313). Although a number of departments within the National Development and Reform Commission (NDRC) were consolidated into a single Energy Bureau in 2003, it does not have the same authority as a ministerial-level organization (Andrews-Speed 2004, 26) and therefore lacks the clout to reconcile conflicting interests and coordinate among the various government stakeholders and state-owned energy companies (Downs 2006, 18). The lack of a central administration has weakened the government’s control over energy sector developments and led to weakness and inefficiency in its administration (Xi et al. 2005, 313).

Weak Regulatory Environment

A fourth and final challenge in reaching energy efficiency goals is the lack of a strong regulatory environment. Since businesses and even some officials will continue to prioritize sales growth over efficiency, strict regulations will need to be put in place and enforced in order to change behaviors. However, the weakness of the regulatory environment and policy apparatus make it incredibly challenging to enforce such measures in China. In a 2003 World Bank ranking called “Governance Matters,” China was rated extremely low in “regulatory quality.” Its ranking at 116 put it alongside Nicaragua, Cambodia, Papua New Guinea, Egypt and Mali and “below India, Mexico and Russia, three countries normally known for weak regulatory regimes” (Pei 2006, 5).

At the heart of these regulatory problems is a weak judicial system that severely limits the enforceability of government policies, making it far more difficult to prosecute violators and carry out punishments. Particularly in the energy sector, where major state companies as well as private firms are highly influential, “the power of the judiciary and other legal and regulatory institutions, though being gradually enhanced, is still insufficient for it to play a major role” (Andrews-Speed 2004, 32). This weak judicial system stems from a shortage of trained lawyers and a lack of independence from the government and Communist Party (Andrews-Speed 2004, 191). Judicial independence is especially a problem at the local level in which the governments control the appointment of judges as well as court finances (Pei 2006, 70). Given this overlap in judicial and administrative jurisdictions, it is not uncommon for local interests to supersede national law in a widespread phenomenon known as “local protectionism” (Pei 2006, 71-71). Given the negative relationship between energy efficiency requirements and near-term economic

gains, local protectionism is likely to continue to be a problem as the government tries to implement efficiency measures.

Reduced staffing in the civil service as a result of reforms in 1998 has also contributed to the weak regulatory environment, depriving the government of the manpower and expertise needed to make and implement energy policy (Andrews-Speed 2004, 31). For example, the staff of the Energy Bureau, formed to coordinate central government energy policy, consisted of only 57 people in 2005 (Downs 2006, 18). Environmental regulatory bodies could also be used to implement and enforce energy efficiency measures, but they too suffer from staffing limitations. The State Environmental Protection Agency (SEPA), the country's "most important environmental authority" has only 300 full-time professional staff in Beijing and a few hundred in the rest of China. By comparison, the U.S. Environmental Protection Agency has 9,000 staffers in Washington, DC alone (Economy 2007).

POLICY OPTIONS FOR ENERGY EFFICIENCY

The challenges Chinese leaders face as they try to meet their self-imposed efficiency targets are formidable and to date have prevented development of the necessary consensus on a comprehensive strategy for meeting energy goals. As leaders weigh possible policy options, they will need to consider their likelihood of success in the existing policy development and implementation environment and whether or not adjustments to the existing political and administrative systems are necessary.

While there are a broad range of potential policies that could be adopted to address the problem of energy efficiency in China, they fall into one of two categories: those that target key sectors of the economy with additional regulations or incentives; and those that address the underlying issues of policy development, implementation and enforcement through administrative and political reforms. These categories are not mutually exclusive and the government could pursue solutions from each.

The first category of policies involves targeting of key sectors of the economy for energy efficiency improvements. This could be done through an array of mechanisms including additional regulations, government investment, pricing schemes, and tax incentives. Such policies could be targeted at both industry and consumers. High energy using sectors to target might include: "power generation, industry, transportation, and residential and commercial building" (Berrah et al. 2007, 48).

Since industry accounts for 70 percent of China's energy demand (Andrews-Speed 2004, 142), it is a large and obvious target for energy efficiency measures. One way industrial energy use can be reduced is by reorienting the economy towards less energy-intensive industries. In line with this approach, Premier Wen Jibao issued a warning to local officials to shut down some of the plants in the most energy-intensive industries, including "power generation and aluminum, copper, steel, coke and coal, and cement production" (Economy 2007). Wen also suggested that other energy-intensive industries be denied tax breaks and production incentives. To date, however, this policy seems to have had little to no effect. The six industries that Wen targeted for reductions actually increased their output by 20.6 percent in the first quarter of 2007

(Economy 2007). This suggests that local officials who prioritize economic growth over energy efficiency tend to protect industry from nationally imposed regulations, revealing one of the potential problems with targeting industry. The weak regulatory environment allows this problem to persist. Moreover, there may be limited support for such industry restructuring measures even at the highest levels of government due to the negative near-term effects they could have on China's economic growth. However, targeted policies using positive reinforcement in the form of tax incentives and government investment towards more energy efficient technology may help to get around the competing incentive of economic growth.

The government could also target consumers with its energy efficiency policies. One way to do so would be to adjust energy prices. Currently the Chinese government provides fuel subsidies, preferring to maintain lower fuel costs for Chinese consumers rather than moderating demand (Downs 2006, 26). This may be due in part to the government's fostering of a domestic auto industry, but it also reflects a prioritization of domestic stability over other objectives such as fuel efficiency and corporate profitability: both taxi drivers and farmers have protested increases in gasoline prices in the past (Downs 2006, 29). Yet discrepancies between domestic and international market pricing are facilitating the growing demand for oil, are costly for the Chinese government, and were at least in part responsible for the oil shortages in Guangdong Province in the summer 2005 (Downs 2006, 7). A similar argument could be made for adjusting electricity prices to reflect the full costs of production and transmission in order to encourage consumer conservation, but thus far the government has been unwilling to raise prices nationally (Ebel 2005, 64).

A second group of policy options center around administrative and political reforms. Although not directly targeted at energy use and efficiency, such reform would address the underlying challenges of policy coordination, development, and enforcement. Addressing these challenges will thereby improve the likelihood of successful policy implementation. Administrative reforms might involve bureaucratic re-organization at the central government level to address the problem of uncoordinated policies and overlapping jurisdictions, perhaps through the re-establishment of the Energy Ministry or a new ministerial-level body. However, it may be difficult to achieve consensus among the leadership group on this sort of reform if they feel that political fiefdoms are threatened.

Other reforms might address the issue of central government to local government control by adjusting incentive systems and improving enforcement. One way for the Chinese government to address the problems of local government transparency and accountability would be to grant more freedom to NGOs (both Chinese and international) and the media in order to pressure local governments to act. This sort of model was used to some effect by the regime to uncover instances of corruption at lower levels of government, in which investigative journalists were permitted to pursue some corruption stories. Elizabeth Economy characterizes civil society and the media as the "most potent . . . force for environmental change in China" (Economy 2007). SEPA support for environmental NGOs has been fairly strong with high-ranking officials highlighting their necessity in protecting the environment (Economy 2005), but the Chinese government in general remains conflicted over the appropriate role of NGOs. While NGOs may be helpful in uncovering non-compliance, there is also a fear in some quarters that

environmental NGOs could promote a different agenda, eroding the CCP's political control (Lee 2006).

CONCLUSION

The argument that improved energy efficiency is necessary for the Chinese regime to achieve its three core objectives of power, prosperity and prestige seems to have persuaded the country's top leadership that action must be taken. However, the specific challenges associated with implementing efficiency policies, including the competing goal of economic growth, the limited accountability of local governments, tangled central bureaucracy, limited accountability of local governments, and to a weak regulatory environment, have made it difficult for the central leadership to agree to a path forward for achieving its efficiency goals.

For now, the government appears to be relying on additional laws and regulations to achieve the efficiency targets it has laid out. The 2007 Climate Change Programme states the regime's intent to strengthen laws and regulations and target a number of very specific industries and sectors of the economy (National Development and Reform Commission 2007, 36-47). And in late 2007 the government issued a draft of its proposed Energy Law, which aims to comprehensively address "energy development, utilization and management" (Andrews Speed 2008). However, the draft Energy Law is broad in scope and does not directly or specifically address the many problems that have plagued Chinese energy policy-making up to this point. For instance, the draft law avoids dealing with the problem of overlapping ministry and agency authority by instead using "the well-worn phrase 'the relevant departments in charge of energy issues'" (Andrews-Speed 2008).

The regime's willingness to introduce administrative and political reforms is still uncertain. The leadership did establish the Energy Leading Group (ELG) in 2005, and this supra-ministerial coordinating body is headed by Wen himself and supported by the State Energy Office (Downs 2006, 19). However, the ELG is not a bureaucratic re-organization and falls well short of the ministerial-level agency that some argue is needed because it issues guiding principles rather than actual policies and is not involved in the day-to-day business of the energy sector (Downs 2006, 20-21). The establishment of the ELG has allowed the government to demonstrate to the Chinese public that they are actively addressing the energy problem and has also bought the regime time to determine how, if at all, to restructure the bureaucracy and reduce the influence of large energy firms (Downs 2006, 20).

Without addressing the underlying challenges of policy enforcement through some sort of administrative or political reform, the extent to which additional regulations will be able to achieve the desired improvements in energy efficiency is unclear. However, the Chinese leadership could well determine that the risks to its own power associated with such reforms outweigh the benefits of broader efficiency implementation, and so instead continue to settle for imperfect policy implementation and enforcement.

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