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“Sixteen of the world's 20 most polluted cities are in China, 70 percent of the country's lakes and rivers are polluted, and half the population lacks clean drinking water. The constant smoggy haze over northern China diminishes crop yields. By 2030, the nation will face a water shortage equal to the amount it consumes today; factories in the northwest have already been forced out of business because there just isn't any water. Even Chinese government economists estimate that environmental troubles shave 10 percent off the country's gross domestic product each year” (John Pomfret, the Washington Post). This description of China’s environmental challenges usefully frames the pressing nature of the issues I will discuss today.

My written testimony is divided into two sections. First, I describe the methodology and general conclusions deriving from my research into State Capacity and environmental policy implementation in China. I then apply the results of the research to the Commission’s questions.

Throughout, I supplement and update my State Capacity research with data collected during the 2007-08 academic year I spent in China as a Fulbright scholar. During this period I taught an environment and development course to advanced undergraduates and lectured on the environment in a number of venues around the PRC.

State Capacity and its impact on Environmental Policy Implementation

A broadly accepted definition of state capacity is: *The capacities of states to implement official goals, especially over the actual or potential opposition of powerful social groups or in the face of recalcitrant economic circumstances* (Skocpol, 1985: 9). While a useful general definition, I operationalize State Capacity with three measurable components - human capital, fiscal strength and reach/responsiveness.

Human Capital: The technical and managerial skill level of individuals within the state and its component parts.

Reach/Responsiveness: The degree to which the state is successful in extending its ideology, socio-political structures, and administrative apparatus throughout society (both geographically and into the socio-economic structures of civil society), the responsiveness of these structures and apparatus to the local needs of the society.

Fiscal Strength: The financial capacity of the state or of a given component of the state. This capacity is a function of both current and reasonably feasible revenue streams as well as demands on that revenue.

A state enjoying high human capital, reach/responsiveness and fiscal strength enjoys high capacity and will therefore be more likely to successfully implement a policy (Schwartz, 2001).

To test this assertion I conducted a comparative statistical analysis focusing on the jurisdictions responsible for environmental policy enforcement in China – the provinces. I conducted a quantitative analysis of ten provinces: Liaoning, Heilongjiang, Shandong, Henan, Hubei, Hunan, Guangdong, Jiangsu, Yunan, and Guangxi, with the goal of evaluating the impact of relative state capacity on effective environmental policy enforcement.

Relying on operationalizations for each of the components of state capacity, I identified four relatively high capacity and six relatively low capacity provinces. The high capacity provinces are: Liaoning, Heilongjiang, Jiangsu, and Guangdong.

If capacity indeed influences enforcement, it is reasonable to expect the high capacity provinces to be those where enforcement is relatively effective. I identified relative effectiveness using statistical data available on environmental protection efforts by each of the provinces coupled with the opinions of environment specialists within government, and the Chinese NGO and academic communities. The result was a clear correlation between provinces enjoying high capacity and the effectiveness of their enforcement efforts.

To trace the mechanism through which State Capacity correlates with environmental policy implementation, I conducted a qualitative analysis in one sample province – Jiangsu. With the goal of illustrating a causal relationship, this qualitative analysis drew on interviews with environment officials and site visits to chemical and cement plants. The results of the qualitative analysis lent further support to the original conclusion (Schwartz 2003). State capacity causally influences compliance with environmental policies. As a result, it is reasonable to argue that investing in capacity building in China will have a positive impact on environmental conditions in the country.

However, the research also illustrates that state capacity alone is insufficient to ensure improvements in the environment. In order to better understand the impact of additional contributing factors, we must become familiar with China's environmental protection institutions and initiatives.

Challenges to Environmental Protection in China

Although China has developed a strong and increasingly detailed environmental protection regime, the government bureaucracy charged with implementation suffers from structural weaknesses. The key agency responsible for environmental protection in China is the State Environmental Protection Agency (SEPA) – now the Ministry of Environmental Protection (MEP).

With its March 2008 elevation to Ministry status, the MEP is theoretically equal in rank to its other ministry counterparts. However, as an equal ranking ministry MEP cannot enforce environmental directives over the wishes of these other ministries. Indeed, in reality, most ministries (and provinces, since they too enjoy ranks equivalent to ministries) remain more powerful than the MEP,

a result of the continuing bias favouring economic growth over environmental protection, and revenue generating ministries over those that are revenue negative.

Even within the environmental protection bureaucracy, the MEP does not dominate. The MEP plays an advisory and managerial role vis-à-vis all lower level environmental protection bureaus (EPBs). EPBs monitor factory pollution output, maintain records and collect fees and fines. Although EPBs are required to fulfil MEP directives, unlike in many Western countries, the MEP does not control the budgets or the operations of the EPBs. Funding for EPBs derives from relevant levels of government (provincial governments fund provincial EPBs and municipal governments fund municipal EPBs etc.). While EPBs are responsible for implementing central government/MEP environmental protection policies, they are also responsible to their funding government.

Not surprisingly, sub-national EPB officials are more focussed on the priorities of their funding agency than on those of the often distant and invariably financially insignificant MEP. Local EPB effectiveness is therefore influenced by the nature of their relationships with local government leaders and departments.

Undoubtedly, officials would prefer a clean environment. They are also aware that frequent refusal to obey directives from above contributes to weakening the integrity of the existing political system, a system that justifies their own power and status. They are also influenced by their individual interests.

Officials are appointed by their bureaucratic superiors. Superiors also play a major role in allocating highly sought after investment and trade opportunities. Thus, both the future careers of officials and their region's access to economic benefits are influenced by the satisfaction of their superiors with their cooperativeness and reliability. Successfully implementing directives from above illustrates cooperativeness and reliability and increases the likelihood of promotions.

The ability to carry out directives from above, however, is constrained by the resources available. Lacking sufficient resources to implement all directives from above, sub-national government decision makers must prioritise among the directives they receive, taking into consideration budgetary limitations and what they deem their superiors would view as the top priority policies. The greater the importance ascribed to a particular policy, the greater the likelihood sub-national governments will invest real efforts in its implementation. Since the stated goal of the central government is to achieve a Harmonious Society (since 2004, this is described as striving to achieve ongoing rapid economic development with a more equitable division of the fruits of development as a means to avoid the potential for social volatility), sub-national governments naturally focus on economic growth, job creation and raising revenue rather than on protecting the environment.

Sub-national government decision makers must also consider local interests. Citizens, local factories and businesses place intense pressure on these governments to enable ongoing economic activities, regardless of the pollution generated. A major priority of government officials is to feed, clothe and assure employment for their citizens. Thus, when faced with the choice of enforcing environmental policies that may constrain economic growth, or enabling continued, often polluting economic growth, it is the latter option that tends to prevail.

This is a dilemma faced at each level of the government hierarchy. The greater the bureaucratic (and geographic) distance of governments from the centre (a main source of pressure for environmental protection) and the more closely tied governments are to local industry, the greater the pressure to minimise enforcement of environmental protection policies and focus instead on economic growth. The pressure to minimise any constraints on economic growth derives from above and from below.

The constraints on enforcement of environmental protection policies are most severe at the lowest level of the environmental protection bureaucracy – the county. Largely due to local government emphasis on economic development, at this level funding and staffing are often insufficient and the quality of staff is poor. Unfortunately, it is at the county level where pollution problems are most grave, the result of flourishing township and village enterprises.

In short, the environment protection bureaucracy is constrained in its effectiveness in large part because the incentive to commit to environmental protection is lacking. The existence of high state capacity alone is insufficient to ensure compliance with existing laws and regulations or the development of more robust pollution responses. State capacity measures the *potential* to act - the assessed unit may enjoy fiscal strength, human capital, autonomy and reach/responsiveness at levels conducive to effective enforcement, but may not utilize that potential if no incentive to do so exists.

Based on the above analysis, I draw the following main conclusions. First, State Capacity as I define it does impact the effectiveness of policy implementation – the greater the State’s Capacity, the more likely environmental policies will be effectively implemented. Second, State Capacity alone is not sufficient to ensure effective implementation. A contributing variable is commitment. If the public and the leadership are committed to environmental protection as a high priority, the likelihood of effective implementation rises. Thus, in order to ensure effective environmental policy implementation, it is essential to invest both in capacity building and in strengthening public and government commitment. I draw on these conclusions in my responses to the questions raised by the Commission.

1. Who are the stakeholders in determining China’s environmental policy? Now that China’s State Environmental Protection Agency has been raised to a ministerial level, how will the Ministry of Environmental Protection’s new status affect China’s approach to environmental policies and U.S. bilateral cooperation on the environment?

Key stakeholders include MEP and ministries focusing on environment related issues, government leaders down the bureaucratic chain of command, local Environmental Protection Bureau officials, industry owners and civil society (the latter is discussed in detail in question five).

The change in MEP status is unlikely to have a noticeable impact on its powers and influence. Worth noting is the fact that, even with its newly elevated status, the MEP is a small ministry – perhaps 2,600 officials (of which only 300 are based in Beijing) for a country of 1.3 billion and an environment under significant stress. Contrast these numbers to the USEPA, with 17,000 employees (not including outside contractors) for a population of 350 million.

In addition, as a bureaucratically equal ministry, the MEP cannot force other ministries to adhere to its recommendations. Indeed, most environmentally related issues cross bureaucratic lines (e.g. responsibility for forests lies with many ministries, including the MEP and the forestry ministry, among others) requiring cooperation and compromise among various ministries. The result – constraints on MEP power.

The structure and funding of the environmental protection bureaucracy further constrains the power and influence of the MEP and its subordinate units. Funding for local environmental protection bureaus (EPBs) derives from local governments as well as from fines and fees paid by polluting factories. Local government officials (Party officials) depend on their superiors for promotion and advancement. Promotion and advancement are largely driven by maintaining stability, increasing local tax revenue and achieving high employment. Penalizing local factories contributes negatively to all of these goals. Therefore, there is little incentive for local governments to support efficient and effective EPB work. In turn, local EPB workers – the enforcers of environmental regulations and laws - have little incentive to be overly enthusiastic in effective enforcement since their superiors are unenthusiastic and because too good a job of enforcement may harm local industries – one of the main revenue sources for the EPBs.

Finally, existing fine and fee structures are such that industries generally find it more cost-effective to pay pollution fines and fees than to invest in the pollution abatement technologies necessary to meet mandated pollution discharge standards.

For example, China is the largest producer and consumer of cement in the world. The technologies for clean cement production are not complicated (e.g. baghouses and electrostatic stack scrubbers). However, because of the outdated technologies used to produce cement in the vast majority of Chinese cement plants (such as vertical kilns) and intense competition, profit margins are small and the added cost of pollution abatement is considered unaffordable. The local government wishes to maintain jobs and tax revenue to keep the public (and higher levels of government) happy; local EPB officials wish to avoid angering their superiors and wish to protect revenue sources; and, local industry wants to maximize production and earnings while minimizing expenditures. The result is collaboration among these three groups to “talk the talk while avoiding the necessity of walking the walk”.

To some extent a similar situation exists at the central government level. Central government leaders are clearly growing increasingly aware and concerned about the environmental challenges China faces. This arises from international pressure, visits abroad and access to the vast information on environmental degradation and its impacts that is provided by MEP and other sources. The result is a growing willingness at the central level to take high profile initiatives to illustrate a commitment to environmental protection as a priority (including numerous declarations by president Hu Jintao and premier Wen Jiabao).

MEP vice-minister Pan Yue is among the most outspoken and articulate examples of this kind of initiative. He has spoken in numerous public forums – both domestic and international – on the nature of the environmental challenges China faces and the action China must take to resolve the challenges. His outspokenness has made Pan Yue very popular with the international environmental community. However, again reflecting the relative importance of economic

growth, by so often speaking publicly and critically, Pan Yue has become something of a liability, and has seen his influence decline.

Given the recognized popularity of environmental issues in the international community, China's leadership is likely to continue to offer supportive words regarding environmental issues while being less willing to take real action. This is well exemplified by the Green GDP initiative. China's leadership took the initiative to develop a "true" measure of GDP growth by including the environmental costs of development. However, the Green GDP tool was quietly shelved when it was realized how embarrassing the results were. The demise of the Green GDP initiative reflects the ongoing contradiction between lofty environmentally supportive rhetoric and pragmatic economic considerations. I discuss the potential US role later in the testimony.

2. How are China's patterns of energy consumption linked to rising environmental problems in the country? What are the most pressing environmental problems, and what are the effects of those problems on China's economic growth, public health, and environmental sustainability?

China relies on coal for eighty percent of its energy needs. Coal in China ranges from relatively clean to highly sulfuric in content. While China is currently drawing heavily on its high quality, relatively clean coal, because of growing energy demand, we should expect a change. China is rapidly burning through its reserves of clean coal (Bituminous) and will soon become more dependent on lower energy and higher sulfur content coal (lignite). Thus, both rising demand for coal and its declining quality will result in increased pollution loads (soot, sulfur, CO₂) over the coming 15-20 years (depending on estimates). In addition, because China's production efficiency is low, the demand for resources per unit of productivity is far greater than is sustainable. And, because the state highly subsidizes energy, there is little incentive to develop efficiencies.

Based on MEP data:

1. Production in Japan is seven times more efficient than in China; in the US it is six times more efficient and in India it is three times more efficient.
2. China's labor efficiency is less than 10% the global average, yet her emissions are 10 times higher.
3. Over the past 50 years, China has lost half of its arable land
4. 1/3 of China suffers acid rain
5. 300 million rural people have no access to clean drinking water
6. 1/3 of urban residents breathe heavily polluted air

Drawing on these data, China's current growth model is clearly unsustainable. As the MEP itself estimates, China is already being forced to expend between 8-13 percent of its GDP on addressing environmental damage caused by its economic growth model (this number can only increase).

The public health consequences of unrestrained development are worthy of special attention. Clearly, growing shortages of clean water and air are key challenges to China's ongoing economic development. Insufficient clean water negatively impacts agricultural production, and industry (particularly problematic in China's arid north). Public health suffers as the public is forced to rely on polluted water for bathing, cleaning and drinking. Public health is further

impacted by stunningly polluted air. This double threat to economic growth, productivity and quality of life is rising at a time when the traditional public health system that in past provided all citizens with coverage has been allowed to collapse. The old health care system was predicated on providing basic preventive care to all citizens either through their work units (urban areas) or communes (rural areas). However, with the passing of the planned economy, the Chinese health care system shifted to an emphasis on Western-style curative care. Curative care is far more expensive, is less efficient in dealing with broader health challenges, and fails to reach the majority of China's rural, and to a lesser extent, urban populations.

Although recently efforts have been made by the central governments to alter this reality, by and large the situation is one where health challenges are rapidly increasing, while solutions are becoming increasingly costly or simply unavailable to the majority of Chinese citizens (Schwartz and Evans, 2007). Clearly, China's economic growth, environmental sustainability and public health are negatively impacted by these developments.

3. What are the transnational environmental effects of China's energy consumption? For example, how will China's planned hydropower development of the upper regions of the Mekong River affect the environment of downstream nations that rely on the river for water supplies? How is the United States' environment affected by China's energy use?

I do not address this question.

4. What tools are available for enforcing environmental standards in China, and how effective are they? How might these tools be expanded to improve compliance? What role can the United States play in assisting the enforcement of environmental regulations in China?

A review of China's environment laws and regulations indicates that China has developed an impressive array of tools to address environmental challenges. In many cases China surpasses WHO and US standards (e.g. for automobile emissions and fuel efficiency where 2008 requirements in China exceed equivalent US requirements by 10 percent). However, the main challenge lies in implementation. As noted, while China has developed solid environmental laws and regulations and the Chinese central government has tremendous coercive power (high state capacity), it lacks a sufficient commitment to implementation.

A key driver behind the general failure to commit to environmental protection is the view among most officials that the Communist Party depends almost completely on maintaining economic growth and the opportunity for prosperity for all its people as a central source of legitimacy to rule (the other main source is nationalism as finds reflection in the rhetoric surrounding the Olympics, the Taiwan question and Tibet). A sort of unwritten contract exists between the Party and the public – the Party promises to keep the economy booming and in return, the public promises to stay out of politics. The leadership (and the public in general) believe that overly enthusiastic enforcement of environmental regulations and laws will slow the economy and raise public dissatisfaction – a threat to the Party's ongoing rule.

The leadership's goal of economic growth and development is shared by the population in general. Accepted thinking among leaders and the general population is that China should follow in the footsteps of developed countries in what is described by some theoreticians as an environmental Kuznets curve. The environmental Kuznets curve describes a relationship where,

as economic growth rises so too do pollution levels. However, at a certain per-capita level of income, environmental conditions begin to improve as an increasingly prosperous public demands a better environment (some theorists argue that at a per capita income of \$1,400 we can expect increased access to clean drinking water and at \$3,200 we can expect a decline in smoke and soot. Note that in 2007, Chinese per capital income was \$2,360).

Numerous discussions with academics and students indicate that (even if unfamiliar with the theory) this view is widely held. It is comforting to imagine that the Environmental Kuznets curve appropriately describes China's development path and that in time all will be well with China's (and the global) environment (i.e. China will focus on economic growth, and eventually it will go back and clean up its mess). Unfortunately there is reason to question the validity of the Kuznets model. For example, the United States is a highly developed and wealthy country, and yet we produce the most greenhouse gas emissions per capita of any country in the world (China has recently gained the dubious honor of surpassing the US as the planet's largest *total* producer of greenhouse gases). Furthermore, even were predictions based on the Kuznets model accurate, the impact on the environment of 1.3 billion people striving to reach the top of the bell curve will likely result in irreversible ecological damage.

Of course, it is widely accepted among the public that, even were the public to reject the image drawn by the Kuznets model, government officials are far too focused on economic development to be responsive to citizens expressing environmental concerns.

This assumption of government insensitivity is largely borne out, though there are occasional exceptions. Just in the past there have been a number of examples of protests forcing the government to back down from planned, environmentally damaging, development. In one case in 2007, residents of Xiamen (Fujian province) stopped development of a large (Taiwanese) chemical plant that threatened the health of city residents. In early 2008, Shanghai residents successfully blocked construction of a proposed extension to the Maglev train – a high visibility, high status project. However, notable in both these high profile successes is the relative prosperity of the protesting citizens and the urban context. As Pan Yue notes, major pollution accidents and environmental crises are regularly occurring across the country with very little notice or action being taken.

As this discussion illustrates, China does not lack environmental protection institutions (though they could benefit from expansion and improvement), nor does it lack a regulatory framework (though this too could be expanded and strengthened). Also notable is that China enjoys high state capacity – the *potential* to effectively implement policies. What China lacks, and the key to success, is a *commitment* to enforcing existing environmental laws and regulations.

Perhaps the most important initiative that the Chinese and US governments can take is to strengthen China's commitment to enforcement. This can only be done by convincing the Chinese leadership and industry that environmentally sound development will not come at the expense of economic growth (and by extension to the detriment of the Party's legitimacy to rule). To convince the Chinese leadership, the US should prioritize pollution abatement technology transfers. Highly subsidized or preferably free, these technologies (e.g. pollution measurement

technologies and examples of effective laws, regulations and enforcement mechanisms) should be made available throughout the government bureaucracy as well as at the factory level.

An example of a factory level initiative can be found in programs developed by both the Canadian and UK government development agencies. These programs provided funds and expertise to install pilot pollution abatement facilities at the factory level in various provinces (using imported technologies). The goal of the programs was to illustrate the economic and environmental benefits of pollution abatement technologies, while providing factory owners with incentives to include environmental considerations in their business plans.

Perhaps most difficult is the question of leadership on pollution abatement. While giving lectures and attending meetings on environment-related topics in China I have repeatedly been confronted with Chinese audiences that question the US position and inquire why it does not lead by example. The fact that China is far poorer than the United States, and is polluting less on a per capita basis, limits the US's moral authority when challenging China to do better. Illustrating our commitment to sustainable growth by leading by example and transferring relevant technologies will assuage Chinese concerns that the US is cynically using environmentalism as a means to impede China's economic and political rise.

China has the basic infrastructure necessary to begin effective enforcement of environmental policies. What it lacks is the incentive to commit to further strengthening and actually enforcing its environmental policies. The US can encourage China by transferring technology and expertise, illustrating our strong commitment to environmentally sound growth and pressing the Chinese to reject the "pollute now, pay later" approach to environment and development.

The US role can be summarized as follows: a) encourage the concept of environmentally sound development; b) contribute resources to catalyze environmentally sound development; and, c) lead by example towards environmentally sound development.

As I will discuss below, the US should also encourage China's environmental civil society, and cooperation between international environmental civil society and its Chinese counterparts.

5. What steps is China taking on a governmental and non-governmental level to address the environmental impacts of its energy use? What role can the United States play in addressing these problems?

I have already addressed the Chinese government's role. Here I briefly touch on the potential role of non-governmental organizations. There exists an extensive literature focussing on China's growing civil society. While there are differences of opinion on where Chinese civil society is going, there is consensus among scholars that at the forefront of China's civil society movement are China's environmental NGOs (ENGOS).

In general, China's NGOs are carefully monitored and scrutinized. NGOs largely focus on supporting government initiatives (in health care, education, and environmental protection among others). While relatively free to act, ENGOS remain quite constrained as well. Most are engaged in local clean-up initiatives, education, or support for government laws and policies that local governments lack sufficient resources to implement or simply would prefer to ignore. Despite these limits, ENGOS have an important role to play. They offer an outlet for social

activism while raising public awareness. They provide a means to challenge local industries to adhere to existing laws and regulations and they encourage the state to continue to expand its focus on environmental protection.

Over time, many ENGOs have tested the limits of the political space available. Such action is inherently dangerous and can lead to closure of the organization and/or jail time for organization members. Since these organizations should be viewed as making a positive contribution to environmental protection in China (e.g. engaging the public and building and strengthening state incentive to protect the environment) it is beneficial to the US to support and encourage these organizations.

Support and encouragement can come in many forms. Direct and indirect funding for activities and training of China's environment community is the most obvious option. Another important form of support is global public attention. Any environmental organization that tests the political limits on behavior faces the threat of government sanction. However, global public attention and support for such organizations raises their profile and constrains the Chinese state from taking action against these groups with impunity.

Conclusion

The international community has grown increasingly aware of, and concerned with China's steadily deteriorating environment. The impact of this deterioration is felt not only by China, but by the international community as a whole. With growing international awareness have come initiatives to press China to invest in the environment and to assist China in its environmental protection efforts.

Since the aid available will never suffice to overcome the numerous challenges China faces, donors are constantly searching for efficiencies - tools that enable them to identify the strengths and weaknesses of potential aid recipients. The state capacity model enables donors to more efficiently direct the limited aid available. Does a province (or other unit of government) possess the capacity to effectively utilize the aid being proffered? Where are the weaknesses and strengths of the potential recipient? However, the existence of high state capacity does not ensure a willingness to utilize that capacity to achieve a particular goal. There must also be a clear commitment, in this case, to environmentally sound development.

As illustrated by preparations for the 2008 Beijing Olympics, the Chinese government has the capacity to identify a priority (e.g. successful games) and take often drastic action to achieve success (e.g. slash coal production to avoid embarrassing coal mine disasters; move or close polluting industries in Beijing and surrounding provinces; temporarily halt construction in Beijing; drastically curtail transportation in Beijing; and, divert drinking water from as far away as Shanxi province to ensure sufficient supplies during the games. All of these are measures that affected tens of millions of individuals). The Olympics are viewed by the leadership in highly nationalistic terms, with success providing a boost to Party legitimacy to rule. As a result, the incentive to achieve a successful result is sufficient to catalyze the Party and State to action. While perhaps unreasonable to expect a similar level of commitment to environmentally sound development, movement in this direction is clearly desirable.

The US should work to enhance capacity while encouraging a high level of commitment to environmentally sound development in China. It can do so through a combination of technology and expertise transfers, support for and public encouragement of civil society and by leading by example.