EXECUTIVE SUMMARY

to the report

ENVIRONMENTAL GOVERNANCE IN CHINA: RECOMMENDATIONS FOR REFORM FROM INTERNATIONAL EXPERIENCE

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June 2007

NRDC
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This executive summary should be read in conjunction with the complete Natural Resources Defense Council report, "Environmental Governance in China: Recommendations for Reform from International Experience (June 2007)," which includes detailed discussion of each recommendation for reform, along with an explanation and analysis of relevant international best practices.

EXECUTIVE SUMMARY

Introduction

China is quite simply facing the most serious environmental challenges the world has ever seen. The damage done within China is striking in terms of loss to human health, biodiversity, economic value and overall quality of life. The cost of environmental degradation is breathtaking in its scale, equaling anywhere from 3 to 15 percent of China's annual GDP.[1] The speed with which the problem is worsening is unprecedented as well. Estimates of China's carbon dioxide emissions, for example, have consistently lagged behind reality, and predictions of when China might overtake the United States as the leading emitter of carbon dioxide in the world have been amended repeatedly in recent years.[2] There has also been a growing recognition of China's tremendous impact on the global environment in terms of emissions of greenhouse gases, mercury and other pollutants.

These environmental challenges are the result of an unsustainable approach to economic development that many government officials and experts recognize must be reformed. This economic growth has had positive outcomes, including lifting an estimated 400 million people out of absolute poverty and improving the living standards of countless others. However, China has recognized that going forward, economic development must be harmonized with environmental protection.

China has already taken significant steps to address its environmental challenges through the development of an extensive environmental law and enforcement framework, the gradual upgrading of the status of the environmental protection authorities, and a variety of other measures. These efforts have brought some successes at controlling pollution and other environmental problems. Nonetheless, the singular focus of the nation in recent decades has been on economic growth, without sufficient incentive to protect the environment at the same time. The systems of incentives, both official and unofficial, have reflected this focus. Within this context, environmental protection has been given low priority, a situation that has been reflected in compromised environmental laws and regulations, insufficient funding and authority for the environmental bureaucracy, and restrictions on public participation mechanisms that could improve supervision of industrial and government enforcement activities. The result has been an environmental situation in China that has reached crisis proportions. However, China can undoubtedly continue to grow its economy, *while* at the same time protecting and improving its environment.

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[1] SEPA calculated the economic loss caused by environmental pollution in 2004 at 511.8 billion yuan (US$64 billion), about 3.05% of GDP. The World Bank estimated in a 1997 study that air and water pollution, and particularly the impact of these on human health, resulted in damages of at least US $54 billion, or some 8 percent of GDP at the time. And a study by the Chinese Academy of Sciences has put the cost of environmental degradation as high as 15 percent of GDP.

[2] Through 2000, China's carbon emissions were generally not expected to surpass those of the United States until 2020. By 2006, estimates had moved the date up to 2015. In 2007, some estimates put the date at 2010, 2009, and 2007. One recent estimate suggests that China's emissions exceeded the United States' as early as 2006.

The purpose of this report is to suggest potential approaches for China to resolve its environmental challenges and achieve a more sustainable path forward.

First of all, the necessary prerequisite is an understanding by China's leaders that there must be a fundamental change in the importance that China places on environmental protection in order to reach any of China's development goals. There are numerous signs at the highest levels of China's government that this shift has already begun to occur. A necessary corollary is that government leaders must understand that environmental protection can be carried out in a way that does not harm, and even enhances, China's economic well-being. As discussed below, there is ample evidence from international experience – from the U.S., Japan, Germany and others – that this can be done. Moreover, China's own experience is showing that environmental degradation is in fact becoming a drag on economic productivity with heavy costs to human health, loss of arable land and many bodies of water too polluted for even industrial use.

Once these understandings have been reached, the key question becomes exactly what measures China must take to achieve its goals of improved environmental compliance and sustainable development. This report will set forth a series of recommendations for reforming China's environmental enforcement system, drawing primary support from international experience. The fundamental problem for China is that enforcement capacity is simply too weak. The culture of non-compliance that exists in China today is not yet being addressed with sufficient resources. This is a serious problem for the environment and for China's development of rule of law. Government capacity to enforce the law must be strengthened. China must be able to successfully carry out its fundamental task of setting environmental norms and enforcing against violations thereof. At the same time, the legitimacy of China's system for setting environmental standards should be improved by incorporating greater public input, increasing transparency as to how standards are set, and establishing a stronger scientific basis that considers human health impacts among other factors. Environmental standards and norms with greater legitimacy are more likely to elicit compliance from regulated parties.

The task of building government institutional capacity to carry out meaningful environmental enforcement is a fundamental need right now. However, environmental protection in China will be enhanced by concomitant experimentation with alternatives to traditional command-and-control systems (such as market mechanisms). Government enforcement capacity can also be supplemented by enhancing the role of the public in supervision through informational approaches and citizen enforcement mechanisms. Government environmental policy- and decision-making can also be strengthened by the incorporation of public feedback. Finally, the need for enforcement action can be reduced by instituting programs to help build business capacity for environmental compliance, and making concerted public education efforts to change public attitudes and understanding about environmental protection.

A comprehensive approach that brings into play the full range of environmental enforcement and compliance measures available has the greatest chance of success. We therefore propose a comprehensive three-pronged approach that:

- builds government enforcement capacity;

- expands the role and capacity of the public in environmental enforcement and environmental decision-making; and
- creates market and other (e.g., informational) incentives for greater compliance by businesses.

These approaches have proven effective in the U.S. and other countries. No individual prong (and certainly not any particular recommendation within a prong) is sufficient on its own, and – like a three-legged stool – each component is necessary in order for the entire system to stand. But, we believe that these recommendations, fully implemented, have the potential to strengthen China's ability to enjoy continued economic growth, while improving its environmental protection and quality of life at the same time.

The Impetus for Change

China has in recent years recognized the need to address the environmental impacts of its unsustainable development choices. Several factors appear to be driving this recognition.

First, as mentioned above, environmental degradation is beginning to create a significant drag on economic growth. The green GDP initiative led by SEPA and the National Bureau on Statistics is the leading government effort to quantify this drag. Water pollution has had a particularly noticeable impact on economic development, with water so polluted in some places that it is unfit for industrial, let alone human, use. Factories have had to relocate because lack of access to sufficiently clean water has affected their production processes.

Second, environmental degradation has threatened social stability. SEPA announced that in 2005 some 51,000 disputes related to environmental pollution had been reported, and that "mass incidents" related to environmental pollution had been increasing at a rate of 29 percent per annum. Environmental complaints reached 600,000 in 2006, up 30 percent from 2005. More broadly speaking, public environmental awareness in China is arguably higher than it has ever been. Indeed, a recent survey by the government-affiliated environmental NGO China Environmental Culture Promotion Association (CECPA) found that 86 percent of those surveyed "expressed concerns over the possible health damage caused by environment pollution."

Third, greater attention to environmental protection may in part be due to China's growing national prosperity. That is, as China gets richer, it increasingly wants, and will be able to afford, environmental amenities. A World Bank study reported, for example, that in a study of a cohort of countries (including China, Brazil, India, Mexico, the U.S., Finland, the Netherlands and the Philippines), the intensity of organic water pollution decreased by 1 percent for each 1 percent increase in per capita income. Moreover, as per capita income rose from US$500 to $20,000, pollution intensity fell by 90 percent, with the fastest decline before countries reached middle-income status.

Finally, environmental degradation has the potential to have a negative impact on China's international reputation, as China's growing influence brings greater integration and connection with the rest of the world.

High-Level Government Support for Environmental Protection

While China commenced the construction of its modern environmental law and enforcement framework in the late 1970s, it is only in the past decade or so that government has more regularly begun to acknowledge the seriousness of China's environmental challenges and started to suggest that a more balanced approach to economic development is needed. The ostensible elevation of the importance of environmental protection has manifested itself most clearly in China's Five-Year Social and Economic Development Plans (Five-Year Plans or FYPs). In 1995, Chinese leaders stated that central and local governments should abandon the singular focus on GDP maximization and aim at a more balanced growth that takes into consideration all costs, including environmental. The Ninth (1996-2000) and the Tenth (2001-2005) Five-Year Plans reflected this shift in orientation.[3]

In recent years, China's leaders have issued various statements highlighting the need to elevate environmental protection and make it a priority on par with economic development. In December 2005, the State Council issued a Decision on Implementing the Scientific Approach to Development and Strengthening Environmental Protection, which among other things called for strengthened enforcement of environmental laws and regulations, aggressive penalties for non-compliance, and utilization of legal mechanisms to compensate pollution victims. This Decision updated an earlier August 1996 Decision on "Issues Regarding Environmental Protection" that introduced a variety of environmental protection mechanisms.

Moreover, at the Sixth National Conference on Environmental Protection in 2006, Premier Wen Jiabao emphasized three transitions that China must make:

> (1) from a focus on economic growth to a system that places equal emphasis on environmental protection and economic growth;
>
> (2) from environmental protection as a lagging objective to a situation where environmental protection and economic growth are carried out simultaneously; and
>
> (3) from a focus on using administrative measures for environmental protection to a comprehensive approach that utilizes legal, economic, technological and administrative approaches to solve environmental problems.

In China's Eleventh Five-Year Plan, great emphasis has been placed on the achievement of a 20 percent reduction in energy intensity,[4] and the reduction of pollutant emissions such as chemical oxygen demand (COD) and sulfur dioxide by 10 percent, each from 2005 levels.

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[3] The Ninth Five-Year Environmental Plan (FYEP) (1996-2000) set forth by SEPA "acknowledged serious deterioration of the environment and, for the first time, called for the establishment of environmental management and legislative systems." The Tenth FYEP (2001-2005) set forth a variety of environmental targets with respect to river basin protection, acid rain and sulfur dioxide control, urban water pollution control, and so on. The Tenth FYEP called for a number of "institutional and regulatory measures such as integrating environmental considerations into development decision-making, strengthening capacity of environmental management institutions, promoting the use of incentive mechanisms and tightening up enforcement towards non-compliant enterprises responsible for severe pollution that damages public health."

[4] "Energy intensity" refers to energy consumption per unit of GDP.

These government pronouncements suggest a growing recognition of the need to act quickly and forcefully on environmental protection.

Despite all of these efforts, environmental quality in China continues to deteriorate, increasing the risks to human health, loss of biodiversity and China's overall economic well-being.[5] Non-compliance with environmental targets, as well as laws and regulations, is the norm. China has not managed to meet the environmental targets within past FYPs and has failed to meet interim energy and pollution targets after the first year of the 11th FYP.[6]

Breaking the Culture of Non-Compliance While Continuing to Improve China's Economic Well-Being

China has been experimenting with a wide range of measures for environmental protection, and has shown an ability to make significant improvements to its environmental condition. Beijing's short-term, temporary initiatives to clean up local air quality for various important international delegations (such as the 2006 Forum on China-Africa Cooperation), which have led to striking and virtually immediate reductions in air pollution, are evidence of this.[7] Moreover, some areas of the country have shown some promising signs of taking the lead in environmental protection. Jiangsu Province, for example, has taken steps to institute a demand side management system to promote energy efficiency and has developed a system for grading enterprise environmental performance and disclosing this information to the public. The result has been better environmental performance than other parts of China. However, it appears that more aggressive approaches to environmental protection have not been implemented more broadly in China because of serious concerns in certain quarters about holding back economic development.[8]

In order for China to bring all necessary government, business and public stakeholders on board to effectively work together on environmental protection, it will be necessary to overcome this commonly held belief that environmental protection is incompatible with economic development. The "green GDP" initiative led by the State Environmental Protection Administration and the National Bureau of Statistics was one important initiative in this regard demonstrating the harm that environmental degradation could have on economic development, and work to further develop this system should be continued and expanded. Further investment should be made in environmental economics to allow China to better understand the full economic costs of its environmental degradation, and to help develop the most cost-effective ways to protect China's environment. More specific recommendations on this point are beyond the scope of this report, but resolving this

[5] See, e.g., "Environmental Situation Continues to Deteriorate," *Xinhua*, May 23, 2007, noting observations by SEPA Vice Minister Pan Yue that pollution in three major rivers (Songhua, Huai and Hai) and lakes (Tai Hu, Chao Hu) had worsened significantly and that drinking water quality in major cities monitored by SEPA had deteriorated compared to one year prior.

[6] The 2006 interim targets were to reduce energy intensity by 4 percent and pollution emissions by 2 percent. In reality, energy intensity was only reduced by 1.23 percent and sulfur dioxide and COD increased by some 2 percent.

[7] During the Forum on China-Africa Cooperation from Nov. 4-6, 2006, an estimated 800,000 of Beijing's 2.82 million vehicles were taken off the road, leading to a documented 40 percent reduction in NOx.

[8] See, e.g., Benjamin Van Rooij, *Regulating Land and Pollution in China: Lawmaking, Compliance and Enforcement; Theory and Cases*, (Leiden University Press, 2006), 70-78, describing compromises in the 1996 Water Pollution Prevention and Control Law, and 82, describing compromises in the 2000 Air Pollution Prevention and Control Law.

question is absolutely essential to the success of efforts to improve environmental enforcement in China. Without an understanding (and firm evidentiary basis) that environmental protection can help improve China's economic prosperity, efforts to enhance environmental protection will be met by resistance from stakeholders, such as development-oriented ministries, local governments, business enterprises and members of the general public, whose participation, cooperation and innovation in environmental protection are essential.

This debate over the compatibility of environmental protection and economic prosperity has played itself out in all countries around the world, yet countless examples have shown that when faced with predictable and enforced environmental requirements, businesses have found a way to adjust their processes and still continue to grow and profit. For example, in 1998, the New York Times wrote of this phenomenon in the United States:

> There has always been a big gap between industrial leaders who say that they cannot do something and their engineers, who usually figure out a way to do it. Before Congress passed the 1970 Clean Air Act, Detroit argued that significant pollution reductions would be utterly impractical or prohibitively expensive. Then along came the catalytic converter that, at modest cost, eventually cut harmful tailpipe emissions by 95 percent. Likewise, the oil companies predicted economic doom when Congress mandated cleaner fuels in 1990. Their chemists, however, have since managed to produce such fuels without disturbing profits.

Despite the tremendous pressures Chinese authorities face to maintain economic growth and provide improved well-being for a population that grows by 14 million or more per year, the experience of other nations has shown that it is possible to increase GDP and economic activity, while reducing pollution. In the United States, for example, between 1970 and 2005, GDP increased by 195 percent, vehicle miles traveled were up 178 percent, energy consumption increased by 48 percent and the population increased by 42 percent. Yet, aggregate emissions of the six criteria pollutants governed by the Clean Air Act declined by 53 percent (see Figs. 1 and 2 below).[9]

[9] Stronger enforcement has been credited with much of this success, although shifts in industrial mix to lighter industry and export of polluting industry to other countries has certainly played a role.

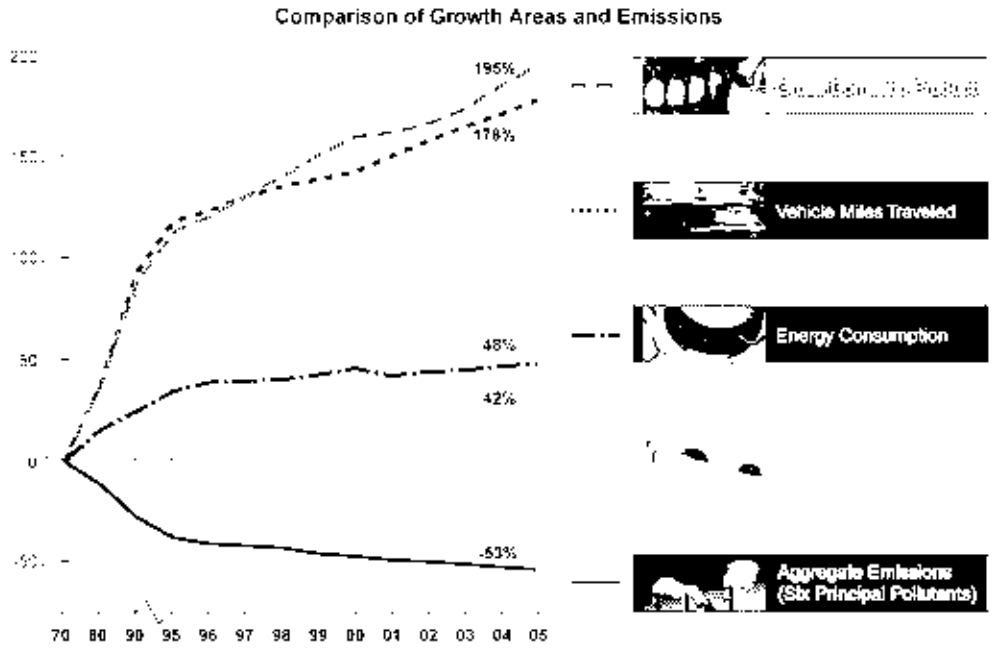

Figure 1. United States (1970-2005)

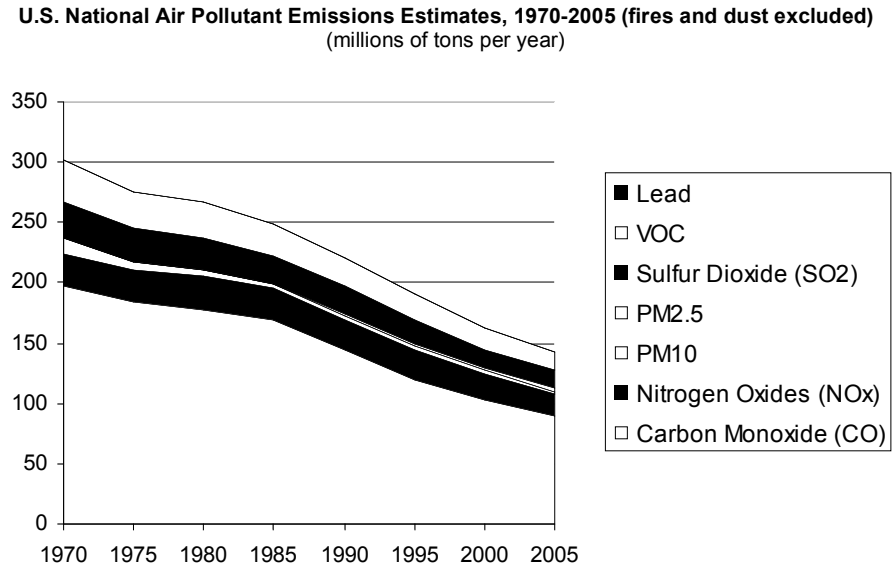

Figure 2.

This issue is not academic in China, as arguments that environmental protection would hamper economic growth are reportedly what led to the scuttling of many necessary changes to China's environmental protection system that were proposed during past legislative proceedings, such as the amendment processes over the Air Pollution Prevention and Control Law and the Water Pollution Prevention and Control Law.[10] For example, a preliminary draft amendment to China's Water Pollution Prevention and Control Law

[10] Van Rooij, *Regulating Land and Pollution in China*, 82, 70-78.

created between 1993 and 1995 contained provisions requiring a total load discharge permit system, a comprehensive national and local system of pollution information disclosure, strengthened enforcement sanctions and public participation, as well as institutional reforms to create more independent EPBs.[11] The provisions were either deleted or severely compromised during preliminary discussions in the drafts. In subsequent legislative processes, the NPC has already shown the political will and the foresight to pass a number of much-needed environmental reforms to which there was significant opposition from certain quarters. In the legislative process for the 2000 amendments to the Air Pollution Prevention and Control Act, for example, China enacted provisions making emissions exceeding environmental standards illegal and enacted a total load discharge permit system (though a broader pollution permit system failed to be enacted).

An increase in "overall consciousness about environmental problems, within the government and among the general population…between 1995 and 1999" made environmentally-favorable changes to the Air Pollution Prevention and Control Law in 2000 and the passage of the 2002 Environmental Impact Assessment possible.[12] The overall consciousness of environmental issues as of 2007 is arguably higher than it has ever been in China, and the time is right for further changes to fundamentally reform China's environmental enforcement system and give it the tools and resources commensurate to the nature of the problem.

OVERVIEW OF RECOMMENDATIONS

This report will suggest legal and policy approaches, drawn from international experience, for improving China's environmental governance framework and the efficacy of its overall environmental protection efforts.

In developed countries, such as the U.S., Germany, and Japan, the primary method of environmental protection has been "command-and-control," followed in later years (particularly in the U.S.) by a shift toward alternatives to command-and-control, such as market-based incentives. A working definition of command-and-control will facilitate our understanding of where the current framework in China is in need of reform. The following definition comes from Benjamin Van Rooij's excellent 2006 study on environmental enforcement in China:[13]

> Command and control regulation…is (mostly administrative) law that the state uses to change economic behavior (mostly of businesses or corporations, and mostly behavior deemed harmful to citizens), first by setting norms for desired behavior – **lawmaking** – and second by detecting violations and issuing sanctions against those who break such norms in order

[11] Van Rooij, *Regulating Land and Pollution in China*, 71, referencing Asian Development Bank, *Reform of Environmental and Land Legislation in the People's Republic of China*, 2000.
[12] See William P. Alford and Benjamin Liebman, "Clean Air, Clean Processes? The Struggle Over Air Pollution Law in the People's Republic of China," *Hastings Law Journal* 52, no. 703 (March 2001); Van Rooij, *Regulating Land and Pollution in China*, 79.
[13] Van Rooij at 5.

to stop occurring violations and prevent violation in the future – **law enforcement.** If regulatory law is successful such lawmaking and law enforcement lead to behavioral changes because the targeted actors will abide by the norms – **compliance**.

A brief overview of the way that command-and-control regulation has evolved in *developed* nations is useful for placing the Chinese experience in a comparative context. For example, in the U.S., from the 1950s to the 1970s, fear of capture of regulators by the regulated led to reforms to strengthen the regulatory state, including through strengthened laws and institutions, limiting discretionary powers, and enhancing enforcement. Arguably, China is in a similar phase, characterized by weak enforcement and laws and a need for enhanced institutions. By the 1980s, concern about over-regulation became dominant, which led to reforms and efforts toward deregulation. In the 1990s, concerns about unreasonable regulation led to a questioning of command-and-control techniques and exploration of self-regulatory and market measures for environmental protection.

In *developing* nations, a primary concern has been how to improve enforcement given weak institutions (lack of financial, technical and political support and capacity) and corruption. Much of the research on developing nation initiatives has focused on the efficacy of non-traditional regulatory instruments, such as financial mechanisms, informational approaches, and community-based enforcement mechanisms.

Thus, in short, an environmental regulatory system should be examined for the efficacy of: (i) the norms it creates, or lawmaking, (ii) its enforcement of violations of those norms and (iii) the ways it promotes compliance with norms. The developed nations initially had their greatest environmental successes by strengthening environmental standards and then by enhancing the ability of their governments, and the public, to identify and punish those who did not adhere to environmental norms. The utilization of self-regulatory and market approaches has sought to reduce the need for enforcement because, properly structured, these alternative measures can cause polluters acting in their own rational self-interest to behave in environmentally favorable ways. The desire to reduce the cost of environmental enforcement and concern about overregulation have been key drivers. The research into developing world experience has focused on alternative measures for achieving stated norms as well, but more as an alternative to ineffective command-and-control systems due to persistent weakness in and corruption of enforcement institutions. Moreover, command-and-control measures have tended to work the best on large point-sources of pollution "which have limited, homogeneous and well-understood options for pollution control, such as industrial facilities or the manufacture of mass-produced products."[14] Market-based incentives (such as tradable emissions allowances, deposit/refund programs, pollution taxes), and information-based incentives (such as product labeling, enterprise pollution information release) have been thought of as alternatives to command-and-control that might help to control smaller, dispersed sources, while also reducing the cost of managing pollution in larger facilities.

[14] National Academy of Public Administration, *Setting Priorities, Getting Results: A New Direction for the Environmental Protection Agency* (1995), at 22.

As we consider how to promote compliance, another initial point to mention concerns why polluters comply or do not comply with environmental norms. Experts have posited that compliance can be viewed from three perspectives:

- Rationality: Polluters are rational actors who will balance the costs and benefits of compliance and will comply with environmental norms if the costs of doing so are less than the costs of non-compliance.
- Morality: Polluters also often comply with norms even though the chance of detection or costs of non-compliance are low because compliance is considered the right or moral thing to do. Conversely, unreasonable norms are more likely to be violated by polluters and the chances of compliance are slimmer.
- Competence: Polluters will be less likely to comply if compliance is extremely complex or if polluter capacity to comply is fundamentally low.

Most of the discussion around the topic of environmental enforcement centers on the first perspective, *rationality* or *rational choice*. It is widely acknowledged that the cost of environmental compliance in China is generally higher than the cost of non-compliance because pollution fees are too low, the risk of detection is not significant, and even when detection occurs it is possible to bargain down penalties or obtain protection from local governments. Many of the recommendations that have been forwarded by various experts are meant to address these problems.

The second perspective, *morality*, suggests the need for the government and the public to make vigorous efforts to change the national attitude toward environmental degradation, to educate the public with respect to the true health and other costs of environmental degradation and to consider the fundamental fairness of some enterprises profiting by shunting environmental costs onto the public (oftentimes on the poorest and least able to bear such costs). Given China's state of economic development, there is a widespread sentiment that environmental degradation is the cost of producing jobs and economic advancement, and that China is simply too undeveloped now to truly focus on environmental protection. In other countries, highly-publicized environmental disasters (such as the Minamata mercury poisoning phenomenon in Japan or Ohio's Cuyahoga River setting on fire) or public movements (such as the publishing of Rachel Carson's *Silent Spring* and the environmental movements of the 1960s and 70s) helped turn the tide on the moral argument. Greater public education and openness in media reporting and public advocacy on the environment in China will likely have the same effect in China.

The final perspective – *competence* - suggests the need to make sure the environmental governance is set up in such a way that polluters understand what is required of them and can actually take steps to comply. Permit systems, for example, have clarified for polluters the exact restrictions to which they are subject. Also, in recent years, government and public organizations in many countries (such as the U.S., Canada, Germany, the UK, Japan, Denmark and Finland) have engaged more directly with polluters to carry out education and to determine ways to comply in a cost-effective manner.

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The recommendations we set forth in this report draw from this broad backdrop. Namely, we recognize, as have many other commentators, the tremendous need in China to strengthen and supplement the already vast command-and-control framework that China has established over the past several decades. A significant number of the recommendations herein are designed to build on this foundation China has set forth by strengthening overall government enforcement capacity. We also draw from the research into environmental regulatory efforts in developing countries to propose a significant investment of resources in non-traditional regulatory measures, with an emphasis on public participation, information disclosure, funding mechanisms for technology upgrades and appropriate pricing to cause polluters to internalize the costs of their pollution. We recognize the need to establish systems that respond to the primary reasons that polluters do not comply with environmental regulations – to appropriately set the costs of non-compliance, so that it is rational for the polluter to comply, to ensure that environmental norms are not unreasonable and have public buy-in, and to help to build competence to comply with regulations. We agree with research suggesting that developing world countries will benefit from an approach that blends enhancement of traditional enforcement capacity, with the utilization of non-traditional methods such as market measures and informational techniques.

Therefore, we recommend that fundamental reforms be implemented without delay in the three key areas of (i) government capacity, (ii) public capacity, and (iii) business capacity and markets.

Government Capacity

a. Elevate SEPA and expand its budget and staffing; establish a national environment leading group within State Council.

The problem of how to bring about environmental protection at the local levels is one that has stymied China for as long as it has attempted to engage in protection of the environment. Like with the United States in the 1960s and 70s, we believe that environmental protection in China would be well-served by a strengthened central environmental authority.

If China wants to improve the effectiveness of its environmental enforcement system, first and foremost the environmental authorities simply must be given greater status, authority and resources. China's investment in environmental enforcement currently lags what domestic experts say is needed and what other countries with successful environmental records have historically invested. This can be accomplished in part by elevating SEPA to full ministry status and creating a Ministry of the Environment, significantly expanding the budget and staffing of this newly elevated entity, and establishing a leading group within the State Council (chaired by the Premier) to coordinate environmental actions across ministries and to demonstrate true national commitment to the environment.

b. Grant SEPA greater funding authority.

A second measure for strengthening national capacity for environmental enforcement is to grant SEPA (or a Ministry of the Environment) authority over funding for such

environmental infrastructure as construction of wastewater treatment facilities, and for aiding local environmental bureaus to build capacity. This sort of funding authority has been extremely effective in the United States for helping U.S. EPA to coordinate and oversee state environmental implementation and enforcement.

c. Strengthen regional supervision offices.

We also recommend a significant enhancement in the capacity of SEPA's regional supervision offices. Such offices can serve to monitor local environmental enforcement and performance, provide technical assistance to local bureaus, manage funding, and generally build expertise regarding the environmental situation in each particular jurisdiction. Strengthened regional offices have the potential to further enhance national capacity to aid environmental protection in local areas. The regional supervision offices currently do not have sufficient levels of funding, staffing or legal authority for enforcement. The U.S. regional office system can serve as an example of how such a system works in practice.

d. Establish a comprehensive discharge permit system; strengthen monitoring and information gathering systems.

China has extensive experience utilizing discharge permits. Nonetheless, the current system does not apply to all pollution sources. Experts have cited this as a significant barrier to environmental enforcement in China. The institution of a comprehensive, nation-wide discharge permit system that clearly sets forth all standards to which a pollution source is subject will significantly enhance government and public supervision. Facility-wide permits have the potential to improve the cost-effectiveness of discharge permitting by allowing enterprises flexibility to choose the most cost-effective ways to comply with environmental laws. To improve enforcement of these permits, monitoring and information gathering systems should be enhanced. Incentive systems to promote self-monitoring and self-reporting should also be instituted to assist consistently overburdened inspection authorities.

e. Strengthen scientific and health basis for environmental standards; increase SEPA's scientific research capacity.

Insufficient scientific rigor in the setting of environmental standards in China and insufficient scientific research capacity within SEPA are further barriers to environmental protection. For example, permit standards are often too lax, and set without reference to scientific or health criteria.

Strengthening the scientific basis for environmental standards and linking standards to health outcomes can provide a clear foundation and theoretical basis that enhances the legitimacy of these standards. Standards with improved legitimacy will have a better chance of gaining compliance. In order to create such standards, SEPA should enhance its scientific research capacity and create specialized laboratories focused on key areas of risk management, health and other issues.

Public Capacity

a. Create a regulatory system that encourages the formation and growth of NGOs.

Environmental non-governmental organizations (NGOs) are increasingly recognized as a positive force for environmental improvement in China. Groups such as Friends of Nature, Global Village of Beijing, Global Environment Institute and others have already made valuable contributions to China's environment, despite limited resources and variety of other barriers. Likewise, NGOs have proven to be powerful vehicles for environmental improvement in countries around the world. China's current legal framework creates a number of barriers to the growth and sustenance of environmental NGOs, including onerous registration requirements, limits on fundraising and the creation of membership organizations, and insufficient incentives for donations and investment in the NGO sector. Removal of these barriers is essential to allowing China's environmental NGOs to fulfill their potential.

b. Establish greater public access to judicial enforcement; allow for government civil judicial enforcement of environmental violations.

Expanding public and NGO access to the courts and administrative mechanisms for dispute resolute will provide environmental authorities with a much needed supplement to their environmental enforcement capabilities. A simple citizen-suit type provision can be structured in a way that is effective in promoting environmental compliance, while avoiding misuse. Such a provision should:

- broaden the types of interests that give one standing to sue (e.g., environmental, not just economic);
- open the door to NGO or other organizational lawsuits; and
- simplify evidentiary requirements and allow the public to help government enforce legal violations.

Moreover, China does not have an official mechanism of government civil judicial enforcement. Such a system would give the government an important new tool for enforcement.

Use of the courts has been a key avenue for promoting environmental protection in countries with markedly different judicial cultures, such as the United States and Japan. The success of judicial measures in the U.S. is perhaps more expected, given the culture of litigation and greater influence of the courts. Nonetheless, judicial action played a key role in improving environmental protection in Japan as well, despite the weaker role of the judiciary and a general cultural aversion to litigation there.

c. Enhance public access to environmental information.

There are two key aspects of public access to environmental information that have proven to be crucial to environmental protection improvements in developed countries. These include general public access to news and other media that increases environmental awareness and fundamentally alters the way the public thinks about the

relationship between humans and the natural environment. The other is a more formalized access to government and polluter-related environmental information. The rights to this sort of information are typically set forth in Freedom of Information-type laws, but are also included as provisions in many environmental laws.

We recommend that China expand its efforts in both aspects. First, television, print media, and other forms of public communication (books, internet) should be encouraged to publish freely about environmental challenges. When environmental accidents or other incidents occur efforts should be made to publicize them widely in order to garner support for taking measures to prevent future such incidents from occurring. Second, China has already taken a major step in passing State Council and SEPA regulations on open information. Steps should taken to ensure that these regulations are properly implemented, including outreach to tell the public how to use these regulations, clear guidance to government on how to interpret exemptions to disclosure and a transparent, independent procedure for appeal of denials of information requests.

The keys to success here will be in avoiding excessive, too-broad utilization of exemptions to information disclosure requirements (such as for state or business secrets), as well as in the establishment of fair and impartial mechanisms for resolving disputes.

d. Broadly establish notice-and-comment procedures.

Notice-and-comment procedures are an inexpensive approach to incorporating public opinion into government decision-making. A complete and broadly-available system of notice-and-comment would enhance environmental enforcement by improving the legitimacy and quality of decisions. This can serve to promote compliance and enhance public supervision after decisions have been completed.

e. Create public environmental advisory committees.

To further enhance public channels for environmental input to the government, China should consider the creation of *environmental advisory committees* at all levels of government that are empowered to (i) transmit public opinion and recommendations on environmental protection to environmental protection officials, and (ii) provide advice and recommendations to environmental officials on development plans, laws and regulations, economic and technical policies and other environmental protection guidelines and measures. We recommend that such environmental advisory committee also be given a role in supervising and serving as ombudsman for public participation processes.

Business Capacity and Markets

a. Require nation-wide implementation of enterprise environmental information disclosure.

Public dissemination of information about the environmental performance of industrial facilities, including data regarding emissions and hazardous materials, informs members of the public of potentially dangerous materials in their midst, creates pressure on

companies to improve their environmental performance, and gives the public the tools to advocate for better environmental performance and monitor whether industrial facilities are complying with environmental laws. This type of information includes (i) public release of industrial facility reports to government on compliance with environmental laws, and (ii) so-called Pollutant Release and Transfer Registers (PRTR) that collect and distribute data on emissions and toxic chemical transfers from industrial facilities. They can also be implemented in modified form by only disclosing ratings of environmental performance (rather than raw pollution data), such as the "Greenwatch" system China has implemented in Jiangsu and the PROPER system in Indonesia.

We recommend a legal requirement to accelerate the nation-wide rollout of the Jiangsu environmental ratings disclosure system, coupled with enhanced monitoring and inspection capacity, as well as stringent (even criminal) penalties for knowingly submitting false data into the system. As with a number of the alternatives to command-and-control we discuss herein, we advise that effective implementation of these systems requires enhancement of traditional enforcement capabilities at the same time in order to assure accurate disclosure and to detect and prevent fraud.

b. Strengthen the pollution fees system.

It is widely acknowledged that pollution charges in China are too low (both with respect to fees for pollution in compliance with standards as well as fines for violations of standards). As a result, rationally acting enterprises will choose to pay the charges rather than controlling pollution because doing so is invariably cheaper than paying to control pollution. This has serious implications for the environment as it is estimated that each 1 percent increase in water pollution fees can lead to 0.8 percent decrease in the intensity of organic water pollution discharged by Chinese enterprises.[15] Each 1 percent increase in air pollution levy can lead to 0.4 percent decrease in suspended particulates from industry.[16] Likewise, fines in the Chinese system do not tend to have the intended deterrent effective because they are typically capped at too-low levels and are not charged for each day of continuing violations. Even with sufficiently high charges, enterprises rarely pay the legally stipulated charges and charge payments are generally the subject of negotiations with local environmental officials.

As a solution, we propose that pollution fees and fines be increased significantly (exactly how much should be determined by careful economic analysis), that fines compound based on each day of violation, and that the authority to levy fines be clarified for regional and central environmental officials to minimize the impact of local protectionism pressures on fine negotiations.

c. Utilize innovative financing vehicles to promote implementation of energy efficiency and pollution control.

[15] *Id.*
[16] *Id.*

It is a widely held belief in China that many enterprises simply cannot take the necessary measures to reduce pollution and still survive economically. However, given that many Chinese enterprises still use equipment that is significantly more polluting and less energy efficient than the world average, there are in fact significant savings to be had from upgrading to more energy efficient, less polluting technologies. At, say, a midsize Chinese steel mill, energy efficiency could save tens of millions of U.S. dollars' worth in electricity bills alone each year. Such upgrades would give an immediate boost to enterprise environmental performance and significantly ease the enforcement burden on environmental authorities.

The key barrier to such upgrades is the upfront investment needed to purchase and install necessary equipment and processes. To resolve this problem, a variety of new programs are now essentially putting free money on the table for implementing energy efficiency upgrades. Premier Wen Jiabao recently cited a pilot project (coordinated by NRDC with Jiangsu province) to provide financial incentives for energy efficiency upgrades in China as a national model, and the government is now considering making these financial incentives available nationwide. Other programs, such as the United States and China's Pollution Prevention & Energy Efficiency (P2E2) program, based in Hong Kong, essentially allow companies to make pollution upgrade and energy efficient improvements for free. Third-party environment and energy service companies pay for all the upfront retrofit costs by taking out bank loans that are partially guaranteed under the program. Loan payments are then made from the subsequent energy and other savings.

The environmental benefits would be substantial. Energy efficiency alone could eliminate the country's need to construct 530-730 coal-fired power plants over the next decade, reducing sulfur dioxide emissions by up to 150 million metric tons; nitrogen oxide emissions by up to five million metric tons; and carbon dioxide emissions by up to 11 billion metric tons.

d. Create government and private capacity to engage business in compliance capacity building.

"Actors lacking the (financial, technical, informational and human) resources necessary for compliance will be more likely to violate."[17] Thus, efforts at compliance promotion are an important supplement to traditional enforcement measures.

The focus of compliance promotion is to provide information to businesses and individuals, which may be done through a variety of ways. Government may provide this assistance, contract to private groups (such as NGOs or consulting firms) to do so, or compliance promotion efforts can be driven by private groups themselves.

e. Require the heads of enterprises to personally certify environmental performance at risk of civil and criminal liability.

[17] Van Rooij at 120.

The accuracy of company reporting is a challenge in any country and China with its culture of environmental non-compliance faces particularly difficult challenges in this respect. The U.S. addressed this in the context of financial reporting fraud by, among other things, requiring CEOs and CFOs of all public companies to sign certifications as to the accuracy of the company's financial statements.[18] Willful certification of false financial statements is punishable by up to 20 years of prison time and up to US$5 million in fines.

A system of personal certification by the leaders of enterprises as to the accuracy of environmental reporting and the proper operation of pollution control equipment, backed by heavy civil and even criminal penalties for false certifications, can focus the attention of leaders on environmental protection.

[18] This requirement was set forth in the Sarbanes-Oxley Act, which responded to a series of corporate fraud discoveries from the 1990s.