



# 点评中国气候变化政策和行动

## Comments on China's Policies and Actions Addressing Climate Change

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China Energy Group, Lawrence Berkeley National Laboratory

世界资源研究所 World Resources Institute

## **项目领导人** Program Director

全球环境研究所执行主任金嘉满

Jin Jiaman, Executive Director, Global Environment Institute (GEI)

## **GEI能源和气候变化项目组官员(按首字笔划顺序)**

GEI Energy and Climate Change Program Officer

田海珍 Tian Hanzhen

任 鹏 Ren Peng

吴 霜 Wu Shuang

封超玲 Feng Chaoling<sup>1</sup>

郭奔驰 Guo Benchi

魏正德 Douglas Whitehead

## **编辑** Editor

王 磊 Wang Lei

---

<sup>1</sup> GEI 实习生

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<sup>1</sup> The views expressed in this review are those of the China Energy Group members and do not represent official views of LBNL or the U.S. government.



## A Summary of International Commentary on the White Paper

### Background

The Global Environmental Institute invited a number of world-renowned climate researchers and organizations<sup>1</sup> to offer public commentary on the *White Paper on China's Policies and Actions for Addressing Climate Change* (henceforth referred to as "the White Paper"), released on October 29, 2008. This foreword summarizes some of the main opinions and suggestions made by those organizations, and aims to encourage exchange and cooperation between China and the international community on policy and information related to climate change.

### Summary of Comments

**The White Paper is a progress report on the implementation of the targets listed in China's National Climate Change Program, released in 2007.** It expresses an understanding of China's commitment to sustainable development as climate change policy, its strict adherence to the principle of "Common but Differentiated Responsibilities," its dependence on technological innovation and its commitment to the *United Nations Framework Convention on Climate Change* (UNFCCC) and the *Kyoto Protocol*, along with other international frameworks on climate change.

**The White Paper illustrates that China's concern about climate change is genuine and is not simply a reaction to international pressure.** Most of the commentators on the White Paper recognize that China places equal weight on mitigating greenhouse gas emissions and adaptation to the effects of climate change domestically, but some commentators also point out that China places a greater emphasis on adaptation.

**The White Paper hints at economic development as China's primary strategic concern, and therefore China will not jeopardize its economy in order to place restrictions on emissions.**

However, the Carnegie Endowment for International Peace (CEIP) argues, optimistically, that the White Paper signals to the international community a willingness from China to make a commitment to emissions reduction. From a strategic standpoint, some commentators feel that it is not evident from the White Paper that the Chinese government has incorporated domestic job-

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<sup>1</sup> These are the Worldwatch Institute (Worldwatch), the Natural Resources Defense Council (NRDC), the China Energy Group at the Lawrence Berkeley National Laboratory (LBNL), the World Resources Institute (WRI) and the Carnegie Endowment for International Peace (CEIP).

creation and national competitiveness into climate policy decision-making process in the White Paper, which are indispensable factors in the United States' policy on climate change.

**The principle of “Common but Differentiated Responsibilities,” emphasized by the White Paper, is one of the main points of discussion and controversy among commentators.**

According to the World Resources Institute (WRI), the White Paper shows that China is already developing a diverse set of emission reduction projects to take on its “Common but Differentiated responsibilities.” On the other hand, other commentators point out that the principle of "common but differentiated responsibilities" is not clearly defined in the White Paper, and that it is difficult to arrive at a definition of this principle that is acceptable to both developing and developed countries.

**The White Paper points out that China’s current per capita emissions are clearly far below that of developed countries, and that this, in a sense, places China on a “moral high ground.”**

However, as commentators point out, this moral high ground is growing shakable as China’s per capita emissions rapidly increase while at the same time developed countries, exemplified by western Europe, are implementing concrete emission reduction targets, thereby indirectly reducing their per capita emissions. Some commentators even predict that by 2020, China’s per capita emissions will double that of the EU. For this reason, controlling its aggregate emissions is both necessary for China and is in its own best interest, and that China should not merely emphasize the importance of comparative objectives such as decreasing emission intensity and energy intensity.

**China has taken many concrete actions in response to climate change that have led to a decrease in carbon emissions. However, the fact that these actions are not ultimately aimed towards a unified reduction target makes them difficult to comprehend.**

The actions China has taken in response to domestic development needs have greatly contributed to emissions reductions. Furthermore, although China has adopted many energy-saving goals and targets and has taken many actions, as discussed in the White Paper, China’s actual GHG emissions continue to grow rapidly, suggesting the need for increased action both domestically and on the part of the international community.

**The White Paper expresses strong support for the Clean Development Mechanism (CDM), while determining the additionality of emission reduction of CDM projects raised questions among commentators.**

Some of the commentators believe in the use of a cost benefit analysis to determine a potential CDM project’s additionality. Other commentators want to know whether a new, more direct and systematic version of the CDM is needed, or if large scale cooperation

projects on emission reduction can come to replace the current diffused CDM projects, which are based on the highly controversial concept of additionality.

**The White Paper should have placed more emphasis on market mechanisms in responding to climate change.** Some commentators believe that the initiative for decreasing greenhouse gas emissions should be given to individuals or industries, and should not depend on a top-down administrative enforcement. The government, in this instance, would play a guiding role in establishing a platform for promoting participation in the market and providing opportunities for market collaboration in international climate discussions.

**The White Paper emphasizes the need for advanced technology transfer and financial support.** A number of commentators feel that the White Paper ought to have listed technological needs on a sectoral basis, and that, rather than simply relying on a platform of technology transfer between governments, the Chinese government should promote technology transfer through a market platform. In order to guarantee fair and impartial technology transfer, China should also perfect its legal system for protecting intellectual property rights. Other commentators feel that the White Paper's definition of technology transfer is way too narrow, limited mainly to a unidirectional transfer of technology from developed to developing countries. Here, technology transfer, refers specifically to high-technology and high cost transfer. In reality, developing countries like China and India have developed a great deal of low-cost, low-technology energy-efficiency technologies, and these technologies have great potential for emission reduction and can easily be applied and transferred to other countries.

**The commentators have, by-and-large, applauded the efforts China has made in information exchange on climate change, but also point out the need for its improvement in terms of the intensity, transparency and quantifiability of its information exchange.** The Chinese government has already begun to show a more open and cooperative attitude towards international climate discussions. A number of commentators feel that China needs to strengthen its methods of information dissemination, not only in raising awareness of environmental policy domestically, but also in declaring its goals and actions in reducing emissions to the international community. The World Watch Institute went as far as suggesting that China could "do more to disseminate" its rich traditions, cultures and philosophies, which it feels could lead people to "nurture a simple, natural and sustainable lifestyle." The Natural Resources Defense Council (NRDC) also notes that the White Paper still does not reflect a high degree of updated communication and transparency of data on GHG emissions, and also expresses concrete opinions on the credibility and estimability of the data given in the White Paper. In addition,

commentators also pointed to a need for the content of the White Paper to be made more publicly accessible.

## **Problems and Suggestions<sup>2</sup>**

### **1. Facts & Data**

China should improve its system of measuring, reporting and analyzing energy data and GHG emissions. More complete and up-to-date statistics and analysis of GHG emissions would improve the White Paper's credibility and would be helpful in understanding future trends in GHG emissions, including the proportion and changes in emission in each sector, as well as the results of different actions taken towards energy conservation. (NDRC)

### **2. Methodology**

The White Paper demonstrates compliance with the principle of monitoring, reporting and verification (MRV). China can use MRV as a method of seeking out and evaluating areas for improvement in its response to climate change. With the acceleration of urbanization in China, urban-planning will play an important role in effective energy conservation; China will need to place particular emphasis on MRV in that area. Moreover, China and the international community should consider incorporating international aid (in the form of finance and technology) into its MRV model. (WRI)

The Chinese government should implement a scientific cost-benefit analysis methodology to set China's climate change policy in order to attract long-term investment in energy conservation. The government should also conduct a cost-benefit analysis on the main policies and programs regarding energy conservation. This includes long-term investment programs, and, in particular, power plants and infrastructure development. This will help the government siphon out the best energy conservation opportunities and cost-benefit programs, as well as the most appropriate policy tools for implementing these programs. (NDRC)

### **3. Approach to Emission Reduction**

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<sup>2</sup> This section summarizes some of the major problems and suggestions about the White Paper identified by the five organizations who contributed essays to this volume. Please refer to original texts for full content. For the content and framework of the White Paper, please consult GEI's Analysis of the White Paper, available.



China needs to establish a transparent means of quantifying emission reductions, based on a growing baseline for carbon emissions. (LBNL)

White Paper emphasizes the significance of China's economic restructuring in addressing climate change. In our understanding, industrial upgrading constitutes an important part of economic restructuring in China, and improving industrial energy efficiency plays an essential role in achieving industrial upgrading. In that sense, would an international sectoral agreement on improving industrial energy efficiency be more acceptable to China than national-level mitigation targets? (GEI's understanding of LBNL China Energy Group's viewpoints)

China has not considered the problem of national competitiveness and job-creation in the climate change policy-making process. Because of this, the WorldWatch Institute suggests that China incorporate these issues into its policy-making process, and pay attention to these issues in bilateral and multilateral discussions. By doing this, it can establish a long-term strategy that is beneficial for economic development. (WorldWatch)

The Chinese government should not simply depend on a top-down system of administrative commands in order to reduce emissions, but rather, should encourage individuals and enterprises to take actions to do so. Moreover, in enacting a policy of technological innovation required for a low carbon economy, China should figure out how it can encourage more participation from the private sector. (WorldWatch)

China should take measures in areas such as mass transit and sustainable urban development, carbon capture and storage, and Environmental Impact Assessment as means to reduce GHG emissions. (NRDC)

China faces an enormous challenge in the implementation and supervision of its energy conservation approach. Therefore, the Carnegie Endowment for International Peace suggests that the central and local governments work more closely in cooperation on this challenge. (CEIP)

#### **4. Evaluation System**

The White Paper lacks a thorough evaluation of policies, programs, actions and technology in response to climate change. China can gain experience and improvement from evaluating existing policies and programs. At the same time, an evaluation of existing technologies and a more detailed list of technological needs in the White Paper would allow the international community to understand the current situation and leadership goals." (LBNL).

## **5. International Negotiations**

China's position in international negotiations when juxtaposed with its extensive domestic development measures that reduce energy use and emissions can seem contradictory to members of the international community. Even though China has not committed to a mandatory reduction target, it could consider putting forth a flexible and amendable framework for negotiations, based on its own needs, and listing priority areas in which it needs help from the international community in reducing GHG emissions, to continue to address domestic development measures while preparing for potential commitments to emission reduction in the future (LBNL)

China could also consider technological transfer with other developing countries in low-carbon technology. China should take the lead in developing high-efficiency, low-cost, technology that can be adapted to different local settings, and promote the global spread of this technology. (Worldwatch).

## **6. Information Dissemination**

The White Paper should put the wealth of bare data and scientific results in Layman's terms, and use a variety of channels to reach out, not only domestically, but also to the international community.■

Advice on  
"White Paper on China's Policies and Actions on Climate Change"

*Christopher Flavin*

*President*

*Worldwatch Institute*

*February 15, 2009*

The White Paper on China's policies and actions on climate change, released in October 2008, provides a comprehensive overview of China's efforts to address the global climate challenge. The White Paper documents the potential effects of climate change on China, the Chinese government's response strategies, and the needs for international cooperation. The paper is particularly timely for decision makers in other countries who seek up to date information on what China is doing to tackle climate change, providing better understanding of the many actions it is taking that will limit greenhouse gas emissions. The paper takes this information to a wide global readership, which had previously been getting a piecemeal picture.

The White Paper will be helpful in mobilizing all units of the Chinese government as well as other sectors of Chinese society to mitigate one of the greatest long-term threats to the country's development—providing a foundation for further policy development. The White Paper also provides a positive example for other developing countries. In addition, it will help bridge North-South mis-understanding on climate policy, and will thereby help smooth the way to a strong new climate agreement in Copenhagen.

I would like to share a few observations and offer some specific advice on the paper, broken down to the four main areas:

**1. Effects of and Challenges Posed by Climate Change in China**

The White Paper reflects a wealth of new scientific research that thoroughly documents the current and potential impacts of climate change on China. The most important thing, though, is to get those dry figures and scientific findings to speak for themselves and to be more easily comprehended by the general public so to inspire them to take initiatives in making a difference. As exemplified by the documentary made by Al Gore "An Inconvenient Truth," the mass media, including traditional printed media, TVs and radios, audio-visuals and more recent internet tools such as Youtube and Facebook, can translate scientific findings into reader friendly information

and make more profound and far-reaching impacts among the general public. It is thus highly advisable that China utilizes more of those communication tools to get the information out, not only among its own people, but also to the global community.

## **2. Principles and Challenges in China's Response to Climate Change**

As stated in the section on the Principles and Challenges in China's Response to Climate Change, China's historic per capita emissions are far below those of most industrial countries. As a developing country which needs to address competing economic, environmental and social priorities, China deserves much credit in having taken serious steps to address climate change. As China's emissions increase rapidly, however, its per capita emissions will catch up soon with those in industrial countries. A closer look, moreover, would find that there is much inequality in per capita emissions inside China as well. Much of the emissions flow from a few highly energy intensive and polluting sectors, while the general public, especially the silent majority of rural residents, have not benefited much from the development which incurs the emissions. How to address this domestic inequality of emissions will challenge the wisdom of Chinese policy makers in climate decision making. In addition, it is time for policy makers to recognize the many economic benefits that could flow from stronger climate policies, including the creation of new industries and jobs, as well as reducing the economic burden from imported energy supplies.

## **3. Targets and Actions Taken by China in Response to Climate Change**

The section on Targets and Actions taken by China in response to climate change demonstrates the admirable power of the Chinese government in devising policy and regulatory tools to mobilize the business sector and the general public in advancing energy policy and addressing climate change. The government's commitment to scientific research and to spurring innovation is particularly admirable and has already had impressive results. In several specific policy areas, such as the Renewable Energy Law, China has already advanced further than most industrial nations have.

While these policies show the political determination of the government, a key issue missing at the moment is how to put the initiative in the hands of individuals and the business sector, rather than relying mainly on top down measures to force them to do so. The Chinese government deserves credit for taking these actions since there is not time to let the market in developing countries including China to eventually curb emissions growth in the distant future. The business sector and the general public, however, hold the key to make sustainable progress if they have the incentive

to. Thus, a challenging issue for China's climate policy makers will be to find ways to provide more incentives to the private sector, while the government focuses on structuring an optimal policy framework for the market to deliver the range of innovations needed to transition to a low carbon economy.

Climate policy making in the US has always taken into account questions of national competitiveness and employment. Both are currently lacking in China's policy making process. In incorporating those issues in future policy making, and raising them in bi-lateral and multi-lateral discussions with other governments, China will devise a strategy that is more economically advantageous in the long-run, and will allow it to work with other countries to ensure that climate policies do not foster a new era of economic protectionism—providing all countries with the economic confidence needed to enact effective new policies.

Another issue that deserves attention is what the business sector and the general public in China has been doing to address climate change. Initiatives from them can serve as good examples for others to learn. China has developed some very effective and low cost local technologies, thanks to its huge industrial base and talent pool of scientists and engineers. Those include solar street lamps, solar water heaters, and efficient light bulbs, to name a few. Wider and faster utilization of such technologies around the globe will make an immediate climate impact. In addition, China has rich traditions, cultures, and philosophies that people could follow to nurture a simple, natural and sustainable lifestyle. Much of this knowledge is unknown outside the Chinese speaking world, and China could do more to disseminate it globally to provide inspiration to others.

#### **4. China's Needs and Provisions in Response to Climate Change**

The White Paper also lays out a clear table of priority issues in which China wants to see enhanced international cooperation. Some of those are the same issues that have deadlocked recent climate negotiations, i.e. technology transfer and a global financial mechanism to facilitate it. In order to overcome the current North-South stalemate over whether government should be a major driver of technology transfer, the challenge is to achieve a clearer delineation of what roles and functions the government and business sectors should each play in encouraging technology transfer. Governments may function best in building strong research capabilities—both in universities and national laboratories—which facilitate research and development of strategically important technologies. It is also important to structure a business-to-business platform to encourage technology transfer via the market.

The practices of technology transfer can be further strengthened by moving beyond the one-way flow of technologies from industrial countries to developing countries. Developing countries, including China, India and Brazil, are already world leaders in many important new low-carbon technologies that could usefully be disseminated to other countries—both industrial and developing. China’s leadership in setting up mechanisms for sharing these technologies with other nations and registering them with the international technology transfer mechanism to encourage business-to-business arrangements for their wider dissemination.

Another thorny issue in technology transfer is the issue of intellectual property rights. In order to create a fair and just environment for technology transfer, it would be useful to create a legal mechanism under the international climate change regime to adjudicate intellectual property right claims for climate related technologies.

In summary, the White Paper provides a comprehensive review of what China has been doing in response to the climate change problem—demonstrating a rapid evolution of new policies over the past several years. If this pace of progress—and openness to new ideas—continues in the coming years, there is good reason that China will assume an important leadership role on climate policy, with profound global implications. ■



## Natural Resources Defense Council Comments on China's White Paper, *China's Policies and Actions for Addressing Climate Change*

February 2009<sup>1</sup>

### Introduction

*China's Policies and Actions for Addressing Climate Change* (the "White Paper"), issued on October 28, 2008, is yet another significant step in elaborating the Chinese government's perspectives on the substantial challenges it faces from global climate change and the policies and actions it is taking and will take to mitigate and adapt to these changes. In recent years, the Chinese government has signaled its intention to aggressively address climate change by reducing its energy intensity, restructuring its economy, and pursuing a "scientific approach to development" that encompasses the notion of sustainable development.

Prior to the White Paper, China has issued several important policy documents including the GEF-sponsored *Initial National Communication on Climate Change* (October 2004), a *National Assessment Report on Climate Change* (December 2006), and a *National Climate Change Action Plan* (June 2007). It is encouraging that China has had a high-level National Leading Group to Address Climate Change since the 1990s, which is now headed by Premier Wen Jiabao, as well as a National Coordination Committee on Climate Change. It is also laudable that China has set aggressive goals for reducing energy intensity by 20% and increasing renewables to 10% of primary energy supply in the Eleventh Five Year Plan (2006-10), and passed or amended several valuable energy conservation, renewable energy and environmental laws. These actions demonstrate a strong commitment to taking concrete actions to reduce the country's carbon intensity and to playing a strong leadership role in the global effort to combat climate change.

As a developing country, China has pointed to the "common but differentiated responsibilities" of developing and developed countries agreed to in the United Nations Framework Convention on

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<sup>1</sup> The Natural Resources Defense Council (NRDC) is a nonprofit environmental organization established in 1970 in the United States. NRDC has been working on environmental issues in China for more than twelve years, with a particular focus on improving energy efficiency in industry and buildings, developing advanced sources of energy, and strengthening environmental law and governance in China. NRDC wishes to thank the Global Environmental Institute, the Chinese government and other participating NGOs and media for the opportunity to exchange views on the White Paper.

Climate Change (UNFCCC), and has emphasized the need for technology and financing to help it to reduce its carbon intensity while continuing to provide the economic development needed to improve the lives of its citizens. It is working productively with other countries to pursue a low-carbon development path, and has played an important role in greenhouse gas reduction projects funded through the Clean Development Mechanism.

The White Paper details the Chinese government's efforts to mitigate and adapt to climate change, and serves to coordinate and focus its own domestic policy and to communicate its actions to other nations. We provide the following comments in the hopes of further strengthening the White Paper and China's climate change policies. In general, we believe the White Paper is an excellent policy document that can be improved through further emphasis on scientific and quantitative analysis of greenhouse gas emissions, and prioritizing of policies and actions to address climate change.<sup>2</sup>

### ***1. Improving measurement, reporting and analysis of greenhouse gas emissions and energy data***

One area in which we believe there is room for expansion in the White Paper is on the facts and data provided on greenhouse gas emissions and energy use. Although we understand that China is still developing its capacity for measuring and reporting GHG emissions data,<sup>3</sup> we believe that a fuller and more up-to-date accounting and analysis of GHG emissions data in the White Paper would add credibility to the document and assist in understanding the trends in China's GHG emissions, including the relative contributions of and changes in emissions sources by sector, and the relative impact that various mitigation actions are likely to have.

For instance, the White Paper notes that China's carbon dioxide emissions from energy consumption in 2004 totaled 5,070 million tons.<sup>4</sup> Similarly, China's National Climate Change Plan states that, according to tentative estimates, China's total GHG emissions in 2004 were about

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<sup>2</sup> Indeed, we note that China precedes the United States in issuing a government white paper addressing its national climate change policies.

<sup>3</sup> We commend China for measuring and reporting initial GHG figures in its Initial Communication, which reports on the emissions of three greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O) in 1994, and recognize that China is pursuing more rigorous GHG emissions measurement and reporting as part of its Second National Communication on Climate Change.

<sup>4</sup> White Paper, section I.



6,100 mtCO<sub>2</sub>e<sup>5</sup>, or 5,600 mtCO<sub>2</sub>e in net emissions, if total carbon sinks are deducted.<sup>6</sup> These figures alone, however, do not permit any further analysis of the means by which the 2004 GHG emissions data were calculated and the relative contributions of various sectors. For example, how does the 5,070 mtCO<sub>2</sub> emissions from energy consumption in 2004 correlate with the 6,100 mtCO<sub>2</sub>e of total GHG emissions – i.e., what sources are included in the additional non-energy consumption sources of GHG emissions, and does the 5,070 million tons of CO<sub>2</sub> from energy consumption in 2004 take into account greenhouse gases other than CO<sub>2</sub>? Without a clearer breakdown of GHG emissions by source and greenhouse gas, it is difficult to understand the means by which the aggregate GHG emissions figures were calculated.<sup>7</sup>

Similarly, temporal analysis of GHG emissions trends is hindered by providing only average annual growth rate figures for extended time periods, rather than year-on-year growth rates and emissions values. For example, the National Climate Change Plan notes that GHG emissions from 1994 to 2004 grew at about 4% per year, and that during the period 1991 to 2005, China's GDP grew at an annual rate of 10.2% while its energy consumption grew at an annual rate of 5.6%, an average elasticity of 0.55. However, in addition to the discrepancy in time periods used, these long time frames mask the rapid growth in energy consumption (and therefore energy-related GHG emissions) from 2001 to 2006, when energy demand and energy-related GHG emissions grew at a faster rate than the 10% annual growth of GDP. Understanding the reasons behind this surge in GHG emissions would be helpful in designing policies to tackle it.

Finally, we understand that the release of GHG emissions data can be sensitive due to calls from developed countries to require developing countries to agree to some form of mandatory restriction on emissions and the desire by developing countries not to hinder economic development. Moreover, as China continues to develop its GHG measurement capabilities, some figures may necessarily be preliminary estimates. Nevertheless, we believe that greater communication and transparency of up-to-date GHG emissions data, even estimates or ranges, will foster increased trust and lead to productive agreements that serve the interests of both developed and developing countries. For example, one option being discussed for a post-Kyoto climate agreement is for developing countries to set sectoral, “no-lose” targets for improving energy efficiency and hence

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<sup>5</sup> Million tons of CO<sub>2</sub> equivalent.

<sup>6</sup> National Climate Change Plan, section 1.2.

<sup>7</sup> For example, the Initial Communication provides a detailed breakdown of 1994 GHG emissions from energy use, industrial processes, agriculture, land use change and forestry, and others. See Initial Communication, Table 2-1.

carbon intensity: there would be no penalty for not meeting these “no-lose” targets, but carbon credits or other technological and financial assistance would be provided for meeting and surpassing them.<sup>8</sup> Greater transparency on GHG emissions and energy use in each sector could improve the chances of reaching such an agreement.

## **2. Pursuing a scientific, benefit-cost analysis of climate change policy options, including CDM, and incentivizing long-term carbon reduction investments**

The Chinese government, like every other government in the world, must decide how to best focus limited resources to address a variety of policy needs. Moreover, climate change presents one of the most complex challenges facing governments worldwide, and any response will necessarily require multi-faceted policy approaches: energy efficiency (in industry, buildings, thermal power generation and distribution, appliances, and transportation), renewables (hydropower, wind, solar, geothermal, biofuels, and nuclear), development of technologies such as carbon capture and storage, and protection of forests and other natural carbon sinks. Using a more transparent benefit-cost approach in the White Paper would help to explain which policy areas present the greatest opportunity for cost-effective GHG reductions and what are the most appropriate policy tools (mandatory or voluntary standards or targets, pricing mechanisms, tariffs and subsidies) for addressing these needs.

In general, we believe it would be helpful for the White Paper to present a fuller analysis of the potential reductions in GHG emissions achievable through various measures. For example, the White Paper states that energy intensity is expected to drop by 20% by 2010 compared to 2005 and that “carbon dioxide emissions will be consequently reduced,”<sup>9</sup> but does not provide an estimate of the expected GHG emissions reduction. Similarly, other measures discuss the amount of standard coal saved through improvements in renewables and energy efficiency, but not the GHG emissions avoided.<sup>10</sup> Using GHG emissions as the primary metric for evaluating the effect of various policies and measures allows them to be evaluated in the context of total GHG emissions.

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<sup>8</sup> See, e.g., Schmidt et al., “Sector-based approach to the post-2012 climate change policy architecture”, *Climate Policy* 8: 494-515 (2008).

<sup>9</sup> White Paper, section III.

<sup>10</sup> See, for example, section IV’s discussion of key energy conservation projects in 2006 and 2007, which cites the amount of coal saved but not GHG emissions avoided.

We believe a similar benefit-cost approach is useful when evaluating international cooperation and the Clean Development Mechanism. China has been an enthusiastic supporter of the CDM as a way to promote investment and technology transfer by developed countries in carbon reduction projects within China. The White Paper states that “CDM projects have effectively boosted the development of China’s renewable energy [and] accelerated the improvement of energy intensity,” and notes that China supports continuation of CDM after 2012, but with greater emphasis on promoting “fairness, transparency, simplicity, certainty and environmental completeness during the implementing of projects,” encouraging technology transfer, and a greater role for the host country in developing CDM projects.<sup>11</sup>

While we support the goals of the CDM, we believe that the White Paper should take note of the serious concerns that have been raised about whether carbon credits generated through the CDM represent actual, additional reductions in GHG emissions. These concerns are on top of procedural issues such as a 2-3 year timeframe for gaining approval of a CDM application, a backlog of project applications awaiting approval, and a likely backlog in the future issuance of credits, all of which threaten to reduce the supply of credits and the stability of the market. We believe that the White Paper should have a greater focus on whether project-based CDM investments are being directed at the most cost-effective carbon reduction projects—energy efficiency and renewables—and whether a reformed CDM or a more direct, systematic approach such as a carbon reduction fund would be the most effective mechanism for aggressively pursuing these opportunities. The White Paper should emphasize the need to create the best institutional structures for insuring that technology transfer and financing from developed countries is most effectively employed.

Finally, a benefit-cost approach would seek to encourage investments in low-carbon options for assets with long lifetimes (30+ years) such as thermal power plants, buildings and other infrastructure. Policies to encourage long-term efficiency investments include gradually increasing coal prices and rewarding or penalizing developers based on the energy efficiency of the buildings they have constructed.

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<sup>11</sup> White Paper, section VII.

### 3. *Additional comments*

We also provide the following additional comments on specific issues addressed in the White Paper:

- *Sustainable urban development and mass transit* – The importance of sustainable urban development and mass transit is not emphasized in the White Paper. Urbanization is a key feature of China’s future development, and we believe that proper planning for “smart growth”—more concentrated urban centers connected by convenient railway, subway, and buses—will play an important role in reducing oil consumption and air pollution from cars, thus ensuring built-in energy efficiency in urban life. One important reason that Americans have a higher energy intensity than Europeans and Japanese is that American cities are larger and more dispersed, and mass transportation is not widely used except in a few major urban centers.
- *Carbon Capture and Storage* – As the White Paper notes, China’s “coal-dominated energy mix cannot be substantially changed in the near future, thus making the control of greenhouse gas emissions rather difficult.”<sup>12</sup> However, CCS is only briefly mentioned in the White Paper.<sup>13</sup> We believe CCS’s potential importance in reducing China’s future emissions merits further elaboration, including discussion of present pilot projects, research on the size of potential storage sites within China, and most importantly the need for planning and siting of thermal power plants being built today so that they can be easily retrofitted with CCS technology in the future.
- *Environmental impact assessment, public participation and open information* – We are encouraged by the efforts made to consider public opinion on climate change policy, and would like to see a requirement that environmental impact assessments of government plans, major buildings and infrastructure (including thermal power plants, industrial facilities, residential and office complexes, highways, etc.) include a requirement that the lifetime GHG emissions from development, construction and operation be calculated and disclosed. Intensive efforts should also be made to strengthen and clarify the system for plan-level environmental impact assessment. Only careful environmental evaluation at this level (e.g., government development plans, municipal transportation plans, etc.) can identify global

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<sup>12</sup> Section I.

<sup>13</sup> Section IV, Developing Renewable Energy and Optimizing Energy Mix, and Section VII.



warming impacts at a scale and early enough stage to allow for effective mitigation. State Council has already developed a draft of implementation regulations for plan environmental impact assessment; however, these regulations have been under consideration since early 2008 and have not yet been promulgated. Further efforts should be made to solicit public input earlier in the EIA process and to ensure that the public has adequate notice and access to information sufficient to allow full and informed public involvement. ■

# China's Policies and Actions for Addressing Climate Change

Comments by Lynn Price, Mark D. Levine, David Fridley, and Nathaniel Aden

China Energy Group, Energy Analysis Department  
Environmental Energy Technologies Division  
Lawrence Berkeley National Laboratory  
Berkeley, California, U.S.A.

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## Introduction

The China Energy Group at Lawrence Berkeley National Laboratory (LBNL) began providing technical assistance to China related to energy efficiency in 1988. During the past 20 years, the China Energy Group has collaborated with numerous Chinese organizations and institutions in an effort to both understand Chinese energy use as well as to provide technical information regarding best practices in the area of energy efficiency, and more recently climate change mitigation.

The China Energy Group greatly appreciates the invitation to review the document titled *China's Policies and Actions for Addressing Climate Change* – also referred to as the “White Paper”. The views expressed in this review are those of the China Energy Group members cited above and do not represent official views of LBNL or the U.S. government. The China Energy Group comments focus on the mitigation and policy aspects of the White Paper and do not address the climate science and adaptation portions of the paper.

## General Observations

China's climate change White Paper provides a comprehensive overview of the impacts of climate change on China, the strategies and objectives for addressing climate change, the policies and actions for mitigating and adapting to climate change, efforts to enhance public awareness of climate change, international cooperation on climate change, and China's climate change institution and mechanism building efforts.

The White Paper reiterates China's core principals as delineated in the climate change negotiations arena: 1) to address climate change in the context of sustainable development, 2) to follow the principal of “common but differentiated responsibilities”, 3) to place equal emphasis on both mitigation and adaptation, 4) recognizing the UNFCCC and the Kyoto Protocol as the main channel for addressing climate change, 5) to rely on scientific advancement of technology and technology transfer, and 6) to rely on public participation and international cooperation. These positions are well known by the international climate change community.

Importantly, the White Paper also outlines a number of significant domestic circumstances, including the pressure to alleviate poverty, meet the needs of a rapidly urbanizing population, develop the economy, strive for rational growth of energy demand, and develop and modernize in a sustainable manner. In response to these pressing domestic concerns, China has implemented a substantial number of policies and programs that were not initiated as a means to address climate change, but that serve the dual purpose of addressing significant national challenges while also reducing greenhouse gas emissions.

It is this juxtaposition – between China’s stated climate change negotiation positions and its domestic developmental needs and actions – that sometimes confounds the international community. On the one hand, China insists that developed countries take the lead in mitigation of climate change in light of the principal of common but differentiated responsibilities. On the other hand, China has undertaken a significant number of domestic policies and programs that reduce greenhouse gas emissions as outlined in this White Paper.

### **Specific Observations**

China’s position on adopting a binding, national-level greenhouse gas emission reduction target or commitment is not included in the White Paper. The paper does, however, explain the 11<sup>th</sup> Five-Year Plan target of a 20% reduction in energy use per unit of GDP between 2005 and 2010, even stating that “emissions will consequently be reduced.” The paper also mentions many other targets or goals that will reduce energy use and associated emissions (e.g. the goal of raising the proportion of added value from the service industry in the GDP by 3 percentage points from 2005 to 2010, raising the share of value added from high-tech industry within the industrial sector by 5 percentage points from 2005 to 2010, target to raise the proportion of renewable energy in the primary energy consumption up to 10% by 2010, etc.). The White Paper then explains that “thanks to all these efforts, energy consumption per unit GDP in 2006 and 2007 in China was lowered by 1.79% and 3.66%, respectively.” It appears that setting such goals or targets can provide overall guidance and motivation for energy-saving and greenhouse gas emission mitigation efforts.

The targets and policies mentioned in the White Paper are essential tools for mitigating climate change. The White Paper provides many examples of the savings due to these policies. However, at the same time that these policies have been enacted, China’s annual carbon emissions have grown at an unprecedented rate. The growth of emissions in the face of policy action underscores the need for a transparent means of quantifying savings given a growing baseline.

The White Paper notes the importance of economic restructuring in mitigating climate change. However, it does not present a position on the potential role of international sectoral agreements in

improving industrial energy efficiency. Would benchmarks and targets in this area be more acceptable than national-level emissions targets?

## **Recommendations**

It is clear that many domestic policies and programs have been undertaken in China that – while often not initiated expressly to address climate change – ultimately reduces greenhouse gas emissions. What is lacking from the White Paper is an evaluation of the efficacy of these policies and programs. Which have been successful and why? Which have not produced the desired impacts? It is important to evaluate actions in order to draw lessons regarding what is successful given the Chinese situation and what needs improvement.

There is a strong desire on the part of much of the international community to address the serious threat of climate change. There is often an equally strong desire to assist developing countries – especially China – in undertaking mitigation efforts. What is needed is an in-depth evaluation by the Chinese outlining specific policies, programs, actions, technologies, and technical assistance desired by China. An elaboration of the “technology need list” would help to move the discussion forward. To date, most climate change efforts have been initiated outside of China and introduced by other countries. The White Paper mentions, for example, a desire to have the host country “play a more important role in the process of developing CDM projects.” As its share of global emissions grows, China should play a more important role in much more than just developing CDM projects – China should let the international community know its specific needs – by sector, by province, by technology – so that international assistance efforts are more likely to be not only welcomed, but ultimately successful in meeting China’s development and climate change mitigation goals.

It would be helpful if the White Paper addressed emerging opportunities for international cooperation. For example, the new U.S. President, Barack Obama, has stated that climate change mitigation is a high priority for his administration. In a recent speech President Obama committed to reducing U.S. emissions by 80% from 1990 levels by 2050. What international actions or what type of framework would be necessary for a similar Chinese commitment to mid- or long-term emissions reductions targets? China is in a unique position to put forward such a framework. What might such a framework look like? What incentives can be established that are acceptable to the parties to the agreement? What commitments are needed by industrialized countries to assure developing countries that they are serious about limiting GHG emissions? Is there a way for CDM to evolve so that commitments by industrialized countries are largely met domestically and much of the capital flow from CDM could be replaced by efforts that more directly enable large-scale activities to reduce greenhouse gas emissions? It would be extremely valuable for China to



propose a framework acceptable to itself and amendable to international negotiation. The times have changed, and it is now clear that the United States will be an active player in efforts to achieve agreements on greenhouse gas emissions. If China is prepared to play a more active leadership role such a position could have very substantial impact.

We believe that two steps by China could help move the discussion forward: offering a framework that is amenable to a negotiation process and indicating the priorities for international assistance in reducing greenhouse gas emissions.■

Comment on the Chinese National Program  
and its Potential Connection to an MRV Approach

*Deborah Seligsohn*

*World Resources Institute*

*February 15, 2009*

China's Climate Change White Paper, published in November 2008, and the National Climate Change Program, issued in June 2007, provide an excellent basis not only for looking at the challenges and opportunities for China's domestic climate change program, but for how this program can form an integral part of the global response. The Bali Action Plan in December 2007 called for "measurable, reportable and verifiable policies and actions" from developing countries, along with strong emissions reductions commitments by developed countries and a requirement to be able to measure, report and verify the range of support to be provided by developed countries to developing countries, including financing, technology and adaptation assistance.

This framework contains within it the possibility that a future climate regime can encompass a diversity of policies and actions, based on countries' institutional strengths and national development goals. China's National Climate Program thus provides an excellent example of how such a system could be considered within the framework of measuring, reporting and verifying policies and actions. The White Paper provides principles that China might use in exploring these options. The notion of a flexible measurable, reportable and verifiable (MRV) system for reporting and assessing Nationally Appropriate Mitigation Actions (NAMAs) conforms to the notion of common but differentiated responsibilities by creating a space for developing countries to engage in mitigation activities and further allows for a system that could facilitate countries to differentiate not only around the outcome of the action (i.e. whether directly contributing to a GHG emissions target or not), where much of the earlier focus was, but on a more broadly defined set of outcomes.

As with most governments, the Chinese government monitors its own programs using a variety of metrics, reporting requirements and verification methodologies. While these have all been developed for internal use in promoting national policy objectives, they provide a useful model for considering systems whereby not only China but other countries can report its NAMAs to the UN Framework Convention on Climate Change (UNFCCC) Secretariat.

China's policies have been clearly defined both in the Program and in the White Paper and their own development reflects a domestic MRV Approach. As an example, I provide below a chart of

how some of the major policy targets within the National Program (on energy intensity, renewable energy and forest cover), as well as some of China's largest energy saving programs are evaluated internally and how this fits in within an MRV Framework. The chart is not complete. There may well be other reporting and verification approaches used, but I hope it illustrates how programs already in place can be considered within an MRV framework.

<b>NAMA</b>	<b>Scope</b>	<b>Metric</b>	<b>Reporting Mechanism</b>	<b>Verification Mechanism</b>	<b>Time Frame</b>
Energy Intensity	National with targets given to each province, locality and State-owned enterprise	Energy used MTCE/Unit GDP	Calculated by the National Bureau of Statistics, and published in the semi-annual statistical bulletin	Collected from multiple sources to ensure cross-checking	Five year goal. Much data is tabulated monthly. Provinces are required to report twice annually
Renewable Energy	National with targets given to provinces and power generation companies	Renewable energy portfolio standard (percentage renewables in total output)	Energy Bureau aggregates data collected by NBS, ministries and industrial associations		Goals for 2010 and 2020, with annual calculations reported
Forest Cover	National	Percentage of total landmass planted in trees	Calculated by the State Forestry Administration's National Forest Resource Inventory	Use both on the ground and remote sensing data as cross-check and confirmation	Five year and longer term goals

<b>NAMA</b>	<b>Scope</b>	<b>Metric</b>	<b>Reporting Mechanism</b>	<b>Verification Mechanism</b>	<b>Time Frame</b>
Top 1000 Enterprises	National targeted at 1000 largest enterprises	Energy Intensity per unit output	Enterprise to local DRC to NDRC	NDRC/ERI verification teams	5 year program with annual targets, twice yearly reporting
Individual Industrial Sector Targets	Set by Sector	Energy Intensity per unit industrial output (valued in RMB)	Individual Ministries to NBS/NDRC	Cross check with provincial figures	Annual and 5 year reporting
Closure of small plants	National, specified closures in electricity and other sectors	GW capacity for power, tons of production capacity in industry	Provincial government reporting to national ministries	Cross checking possible by SERC and NBS for some industries	5 year targets, annual progress reports
Energy Conservation Power Generation Dispatch	Planned to be national within the electric power system, but piloted in 5 provinces	Currently a compliance metric, but no energy metric	Power Plant Performance determined by NDRC at local levels, which then sets the dispatch priority	Local technical bureaus verify efficiency and performance	Compliance and efficiency verified annually

While these programs are currently evaluated for domestic purposes, this type of reporting could actually help inform the international community, and the structure of these programs might provide useful models for other developing countries.

These programs rely heavily on targets and quotas, which appear to be easier for China to implement and enforce than more complex mechanisms. Moreover, they rely quite heavily on primary metrics – energy use, forest cover – rather than accounting calculations like GHG emissions. This combination suits China’s own institutional strengths but might also prove useful to other developing countries. This approach also allows GHG control to integrate directly with overall energy and forest policy, again without using second-order calculations.

The rigor of MRV in the various programs listed above undoubtedly varies. One advantage of evaluating national programs in this way is to identify areas where capacity building might be needed and how to provide it most usefully. In working with our research partners on China's program in an MRV context, for example, we found it hard to identify existent criteria or methodologies to MRV urban planning. As China continues to urbanize planning will be essential to effective mitigation, and thus, this could be a useful area for capacity building and support.

The MRV language in the Bali Action Plan applies not just to mitigation, but also to support. This type of Framework theoretically could be applied to support, as well, and ensure that the support was closely linked to effective NAMAs. Unfortunately, at this point international assistance in general is so diffuse in terms of both sources and recipients that in our experimental examination of how the Chinese National Program might fit into an MRV Framework, we were unable to also chart current support to these programs. This would be a fruitful area for future research looking into how to match the support to the NAMA, how to identify it by types (financing, technology, etc.) and how to use this Framework to ensure capacity building and the enhancing of mitigation capabilities within an overall development framework.■

## China's Policies and Actions for Addressing Climate Change

*Whitney Angell Leonard*

*Carnegie Endowment for International Peace*

*December 10, 2008*

*Author's note (March 11, 2009): This paper was originally conceived as a summary of the White Paper and as a resource for understanding China's stance on climate change. I am pleased and honored that my preliminary commentary helped spark this rigorous discussion which will, in turn, contribute to the process of designing increasingly effective climate policies for China and the world.*

In its recent White Paper addressing climate change, the Chinese government has identified three simultaneous challenges facing the nation. First and foremost, China must adapt to the inevitable changes in its climate, which will impact the country's agriculture, livestock, water resources, biodiversity, forestry, coastal zone development, human health, and general economic prosperity. The government believes that mitigation and adaptation should receive equal emphasis in theory, but in practice China's actions are guided by the belief that adaptation is a more "present and imminent task" for developing countries. While the focus on adaptation may be justified in the near term, it is critical that the government take great care to ensure that adaptation efforts do not obscure the equal importance of climate change mitigation. Fortunately, China's impressive analysis of the domestic impacts of climate change indicate that it understands what is at stake, increasing the likelihood that China will take serious action in both realms.

China has already established a range of policies, programs, and laws aimed at increasing the country's adaptive capacity. Improved early warning systems and stronger infrastructure will play an increasingly important role across many sectors. In the agricultural sector, for example, adaptation programs focus on improving irrigation infrastructure, as well as raising overall crop yield and developing stress-resistant seed varieties. The livestock sector will also see the expansion of hearty livestock strains, along with more careful land management and enhanced measures to detect and prevent animal disease epidemics. Similarly, plans are underway to strengthen protections for forests and other critical ecosystems, aiming to minimize the spread of pests, diseases, and forest fires. For coastal regions and other water resources, early warning and disaster alleviation systems make up part of a comprehensive plan to reduce the impacts of floods and droughts.

The government lists economic development as the second major challenge facing China today, and it has prescribed a program of “sustainable development” to reconcile its economic and environmental goals. China recognizes the magnitude and implications of its development task, admitting that a rapidly expanding economy may make it difficult even to meet its goal of “rational energy growth.” Yet the government has faith in potential environmental-economic synergies, and it has stated a firm commitment to a low-carbon development path. It believes the country can pursue win-win solutions that address development and climate change simultaneously.

The third and final climate-related challenge identified by the Chinese government is the task of limiting the country’s greenhouse gas emissions. Contributing roughly 20% of all global emissions, more than any other single country, China has a huge impact on the global climate. Energy conservation and efficiency form the backbone of the nation’s climate change mitigation policies, with the ambitious goal of reducing energy intensity (per unit of GDP) 20 percent by 2010, compared to 2005 levels. Many large-scale energy conservation projects have already taken effect and more are in the pipeline, which will save hundreds of millions of tons of coal from being burned each year.

This mitigation plan focuses heavily on the industrial sector, as that sector’s relative inefficiency lends itself to large and effective gains. The plan aims to increase the number of industries that consume relatively small amounts of energy and materials, decrease the number of energy-intensive industries, and increase the efficiency of existing industries. This plan includes some economic policies designed to incentivize energy efficiency, but there remain significant barriers to financing efficiency projects, which the government should address as soon as possible. Monitoring compliance also presents some tough challenges, requiring a high level of cooperation between national and local officials, but the government claims that it has already begun to implement an effective monitoring plan. The government also plans to expand recycling programs and strengthen controls on nitrous oxide as additional ways to reduce emissions in the industrial sector.

Furthermore, China aims to increase its share of clean energy by expanding its nuclear capacity, hastening coal-bed gas development, and boosting renewable energy capacity to supply 10 percent of all primary energy as early as 2010. Thanks in part to a set of economic policies that prioritize renewable energy, China already ranks 5th in the world in installed wind power capacity, and it is the world leader by far in installed solar thermal capacity. Today, these power sources continue to expand, as wind power capacity has more than doubled each year for the past several years. Along with biomass, ethanol, and hydropower, which are also expanding rapidly, these

renewable energy sources together displace the equivalent of 220 million tons of coal per year. Finally, the government aims to control methane emissions with improved agricultural methods and plans to increase forest coverage 20 percent by 2010, compared to 2005 levels. This forestry program will put another 50 million tons of carbon dioxide into carbon sinks, accounting for 1 percent of China's total annual emissions.

Despite China's admirable gains and ambitious plans, it is important to note that these emissions "reductions" are measured compared to a business-as-usual scenario. Due to China's rapid economic growth, its total carbon dioxide emissions are projected to increase a staggering 3.3% per year over the next several decades, doubling in just 20 years (Energy Information Administration, International Energy Outlook 2008). So the country clearly faces a difficult task in its effort to control emissions, and the Chinese government is far from monolithic in its commitment to mitigating climate change. Indeed, even in the government's official statement on climate action, different sections highlight conflicting goals; some agencies clearly prioritize the environment while others prioritize economic growth. The resolution of this tension will determine whether the country maintains its commitment to sustainable development—rather than just development—and will determine the success or failure of its commendable environmental goals.

Across all of these goals, the government recognizes that enhancing public awareness of climate change can play an important role. To this end, it launched a series of publicity and education campaigns designed to inform the public about the causes, impacts, and solutions to climate change. In schools and through the mass media, citizens are encouraged to change their consumption behavior, strive toward greater efficiency in their homes, and participate in recycling programs. Serving as a role model itself, the government hopes to create a conservation-minded society that is prepared to address the varied challenges of climate change.

Science and technology will also be crucial tools for China in achieving its climate action goals. The government has identified climate change as a priority field for science and technology research, and it has accordingly gathered experts and formed several scientific bases devoted to climate change. This initiative will approach climate research from a variety of angles, from understanding and monitoring climate systems to developing technologies for mitigation and adaptation. In addition to committing much of its own funding to these projects, the government also hopes to spur greater private investment in this type of climate-related science and technology.

But China believes that international cooperation and technology-sharing—above and beyond domestic research—also have a critical role to play in technological development. Accordingly, the



government is actively developing cooperative research programs with several countries, in both bilateral and multilateral deals. Furthermore, China encourages technology transfer and believes that it should not rely solely on market-based mechanisms; instead, developed countries have a responsibility to provide developing countries with emission-reducing technologies. China therefore tends to highlight its active participation in Clean Development Mechanism (CDM) projects under the Kyoto Protocol and argues that the CDM program should continue after the Protocol's expiration in 2012.

The government repeatedly points to its compliance with the Kyoto Protocol as evidence of its willingness to cooperate internationally, which is certainly a good sign and a promising beginning. Despite its limited obligations under the Protocol, China's very active participation proves that the country is willing to dedicate a significant amount of leadership time to this issue. Moreover, the government's recent actions and negotiations indicate that it may be ready to accept actual mitigation obligations under the next global climate treaty, which in turn will set an important precedent for other developing countries and may encourage the U.S. to agree to binding targets. The Chinese have made it clear that they are willing to shoulder their fair share of the burden in addressing climate change; the difficulty may now lie in finding an acceptable definition of "common but differentiated responsibilities" for developed and developing countries alike. As we move toward a new global treaty at the end of 2009, balancing development and sustainability will be high on the agenda, as a key tool for bridging the gap between Chinese interests, U.S. interests, and the health of our global climate. ■

*Whitney Angell Leonard is the 2008-2009 Junior Fellow for Energy and Climate at the Carnegie Endowment.*

## “White Paper: China’s Policies and Actions on Climate Change”

### An Analysis

#### Foreword

On October 29, 2008, the Chinese government released a white paper on “China’s Policies and Actions on Climate Change” (henceforth referred to as “the white paper”), which details the effects of climate change on China and its strategies and goals in response to climate change, and also the progress of “China’s National Climate Change Programme,” released in 2007<sup>1</sup>. Given the global economic crisis and slow progress in climate change negotiations, this document helps to allow international society to better understand China’s approach to climate change, and its stance on action and international cooperation to combat climate change.

This article provides an analysis of the white paper to help readers both within and outside of China gain a deeper understanding of the measures China has taken and the policies China has enacted in response to climate change. All facts and figures, unless otherwise noted, are taken directly from the white paper itself. At the same time, this article will also offer its own understanding of the policies, measures and actions described in the white paper, the effects of climate change on China as well as the difficulties China faces in response to climate change.

This article looks at four main areas:

1. Effects of and Challenges Posed by Climate Change in China
2. Principles and Challenges in China’s Response to Climate Change
3. Targets and Actions Taken by China in Response to Climate Change
4. China’s Needs and Provisions in Response to Climate Change

#### 1. Effects of and Challenges Posed by Climate Change in China

In recent years, the increase that climate change has brought in extreme weather phenomena, and the increased strength and number of natural disasters in China has been quite apparent. According to Chinese government<sup>2</sup> statistics, 77.862 million people were affected by the blizzard that ravaged 14 Chinese provinces in early 2008, with 485,000 buildings collapsing, 1.686 million homes and 178 million *mu* ( 11.87 million ha) of cropland damaged, and economic losses of up to

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<sup>1</sup> Please refer to “China’s National Climate Change Programme,” released on June 4, 2007.

<sup>2</sup> Ministry of Civil Affairs, <http://www.mca.gov.cn/article/zwgk/mzyw/200801/20080100011296.shtml>

CNY151.65 billion (\$22.3 billion USD). During the same year, the Turpan region of Xinjiang experienced summer temperatures as high as 47.8°C (about 118°F), further exacerbating the drought already plaguing the region and threatening the livelihoods of its farmers<sup>3</sup>.

The unusual weather brought about by climate change has had a profound effect on agricultural production. From 1986 to 2006, China had 21 consecutive warm winters. With this, the frequency of plant diseases and pests increased, which caused a decrease in the production of wheat, corn and rice, posing a great threat to food security.

Climate change has also begun to have a profound influence on the distribution of water resources in China. Over the last 50 years, the volume of glaciers in the northwest of the country has decreased by about 21%, while the thickness of permafrost in the Tibet Autonomous Region has been reduced by 4-5 meters, and the area of some alpine lakes, which are fed by glaciers, has gradually decreased<sup>4</sup>. Water resources have been threatened across the country. Persistent drought in northern China, widespread flooding in southern China and the lack of water resources in northwestern provinces like Gansu and Ningxia has worsened in recent years. Global warming has also caused a continuous rise in sea levels over the last 50 years along China's coastlines, causing seawater encroachment and threatening biodiversity in coral reefs.

A nation's economic development depends heavily on its use of natural resources, which, to a great extent, plays a role in determining the structure of a nation's economy and production. With 1.3 billion people, the lack of per capita resources has caused a major bottleneck in China's economic development. The International Monetary Fund classifies China as a mid-low income country, with a relatively low level of development. Around 14.79 million rural Chinese are unable to feed themselves, and 30 million hover above poverty line. Only with continued development of the Chinese economy can the problem of poverty be addressed. However, energy consumption and CO<sub>2</sub> emissions have a tendency to increase proportionally to development.

Since China's primary energy source is coal<sup>5</sup>, there are some limits in adjusting the country's energy mix. Increasing energy efficiency is one solution, but there are a number of technological and financial obstacles hindering the process. China's dependence on coal for energy cannot be fundamentally changed overnight, further highlighting the importance of reducing energy

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<sup>3</sup> <http://ja.jxcn.cn/5/43/html/20080821/20080821093809>

<sup>4</sup> Please refer to "China's National Climate Change Programme"

<sup>5</sup> In 2005, coal-burning made up for 27.8% of total global energy consumption, of which China's coal use made up for 68.9%

consumption and CO<sub>2</sub> emissions per unit GDP. Increasing forest coverage and protecting biodiversity are also vital for improving the ability of forests and wetlands to serve as carbon sinks<sup>6</sup>. China's greatly weakened eco-environment caused by its rapid development over the last decade—with large scale drought, desertification, soil erosion and wetland degeneration plaguing the country—will make short-term recovery of the eco-environment an uphill battle. Indeed, China will face many challenges in its efforts towards realizing its goals.

## **2. Principles and Challenges in China's Response to Climate Change**

The white paper emphasizes the principle of “Common But Differentiated Responsibilities” (CBDR) outlined in the United Nations Framework Convention on Climate Change (UNFCCC). Here, “common” refers to the responsibility that all nations have in combating climate change, while “differentiated” refers to the different responsibilities and duties each country has due to differences in cumulative historical emissions and current per capita carbon emissions between countries<sup>7</sup>. According to CBDR, developed countries must take the lead in greenhouse gas emission reduction, and also provide financial and technological support to developing countries to do the same. At the same time developing countries should make as much effort as possible to reduce emissions as they work to alleviate poverty and develop their economies. For China's part, it has made a commitment to reduce energy consumption per unit GDP by 20% by the year 2010.

In order to address the apparent conflict between development and emission reduction, and to avert the adverse effects of climate change, China has adopted a strategy of “mitigation and adaptation.” “Mitigation” refers to the use of technology to solve energy consumption problems, meaning that a large scale industrial energy efficiency effort will be a major stepping stone in China's fight against climate change. Mitigation basically will involve energy saving at the national level, optimizing the country's energy mix, increasing energy efficiency, reforestation and afforestation, among others. Energy efficiency will be an effective channel for sustainable development. “Adaptation” means improving the disaster response and coordination mechanisms available to agriculture, forests and other biological systems, water resources, coastlines and other areas sensitive to climate change. This would be done by setting up disaster prevention engineering projects, improving disaster monitoring, prediction, resistance and alleviation systems.

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<sup>6</sup> The ability of a forest or wetland to serve as a carbon sink depends on their ability to and amount they can absorb and store of CO<sub>2</sub>.

<sup>7</sup> [http://www.chinaorg.cn/zt/zt/2008-03/11/content\\_5190204.htm](http://www.chinaorg.cn/zt/zt/2008-03/11/content_5190204.htm)

The “mitigation and adaptation” strategy places great demand on technological innovation and transfer as well as international cooperation.

### **3. Actions and Measures Taken by China in Response to Global Climate Change<sup>8</sup>**

China’s economy has experienced explosive growth since the beginning of its Reform and Opening Up policy in 1978. At the same time, industrial energy consumption has increased dramatically, leading to an apparent conflict between economic development on the one hand and reforming energy mix and pollution reduction on the other. In recent years, the Chinese government has been making a great effort towards energy conservation and efficiency<sup>9</sup>. Through policies and measures such as adjusting the pattern of energy supply and demand, improving energy efficiency, developing clean and renewable energy and reducing pollution and emissions, China has begun to solve energy problems and thereby mitigate climate change. In doing so, China has been very successful in making energy efficiency in high-energy consumption industries, agriculture and forests a major priority. The white paper includes a detailed list of 52 policy measures related to climate change mitigation, among which eight are described in quantified detail. Below is an outline of China’s recent progress in its efforts<sup>10</sup>:

- *Between 2005 and 2010, China aims to decrease energy consumption per unit GDP by 20%.* The outline<sup>11</sup> of China’s 11<sup>th</sup> five-year plan stipulates that China would reduce its per unit GDP energy consumption from 1.22 tons of coal equivalent (tce) per CNY10,000 to 0.98 tce per CNY10,000 in 2010, a decrease of roughly 20%. This is the direct equivalent of reducing around 1500 million tons of CO<sub>2</sub> emission. Between 2006 and 2007, the power, steel, construction and chemical industries were collectively able to reduce about 147 million tce, equivalent to 366 million tons of CO<sub>2</sub>e. However, per unit GDP energy consumption fell 1.79% in 2006 and 3.66% in 2007, which fell short of the expected 4% drop. In light of this, a 20% drop by 2010 seems an ambitious goal.

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<sup>8</sup> Details please per Attachment 1

<sup>9</sup> cf. White Paper p.6-10

<sup>10</sup> Unless otherwise specified, conserving 1kg tce is equivalent to reducing 2.493kg CO<sub>2</sub> or reducing 0.68kg of carbon

<sup>11</sup> China’s five-year plans are a series of national economic development initiatives set by the central government. They cover major nationwide construction projects, distribution of production and major proportional relations in the national economy, and set long-term goals for and the direction of the nation’s economic development.

- *By 2020, China expects renewable energy to account for 16% (including large-scale hydropower) of overall energy demand, or around 530 million tce<sup>12</sup>, amounting to a reduction in emissions of about 1.2 billion CO<sub>2</sub>e<sup>13</sup>.* The Chinese government has been trying to increase the use of renewable energy in the country for a long time. From 1980 to 2007, the proportion of primary renewable energy consumption grew from 4% to 7.2% (including large-scale hydropower), amounting to approximately 220 million tce, or the equivalent of 550 million CO<sub>2</sub>e. On the contrary, the proportion of primary coal consumption fell from 72.2% to 69.4%. By 2010, China hopes that renewable energy production and consumption will reach 270 million tce, with primary energy consumption amounting to 10%, amounting to a reduction of 600 million CO<sub>2</sub>e<sup>14</sup>, among which, the use of wind power, solar power, geothermal power and tidal power will be able to reduce CO<sub>2</sub> emissions by about 60 million tons, biomass 30 million tons and hydropower about 500 million tons<sup>15</sup>.

Meanwhile, China is developing biogas, solar cookers and efficient stoves, among other forms of renewable energy technology in rural areas. By the end of 2007, there were 26.5 million household biogas digesters in operation across the country, replacing around 16 million tce, the equivalent of a reduction of around 44 million CO<sub>2</sub>e. Currently, China is fifth in the world for wind power installed capacity and first in the world for area of solar water heaters for the last several years.

- *By 2020, the coal consumption of thermal power generation will be 345 gce/kWh<sup>16</sup>.* In 2007, 533 small thermal power stations were phased out across the country, with a total installed capacity of 14.38GW. In 2007, the coal consumption of power generation with capacity 6MW or above dropped from 448 gce/kWh in 1980 to 370 gce/kWh. China plans to accelerate the development of thermal power plant technology, optimize thermal power structure, phase out obsolete thermal power units and develop NG-based and CBM-based distributed power generation facilities. Through these measures, it is expected that by 2010, China can reduce carbon emissions by 110 million tons.

- *By 2020, nuclear installed capacity will account for 40GW, or around 4% of installed capacity for the entire country.* China plans to actively promote the development of nuclear power as an

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<sup>12</sup> [http://news.xinhuanet.com/environment/2006-11/16/content\\_5338629.htm](http://news.xinhuanet.com/environment/2006-11/16/content_5338629.htm)

<sup>13</sup> "Mid-Long term Development Plan for Renewable Energy"

<sup>14</sup> "Mid-Long term Development Plan for Renewable Energy"

<sup>15</sup> "China's National Climate Change Programme" p. 31

<sup>16</sup> <http://www.adb.org/Documents/events/2008/ACEF/Session4-Mao.pdf>

important aspect of its energy strategy. It hopes to gradually increase nuclear power's share its energy supply and speed up the development of nuclear energy in wealthy coastal regions which have high demand for electricity and increase overall nuclear power industry capacity. Through this, China expects that it can reduce CO<sub>2</sub> emissions by around 50 million tons.

- *Between 2006 and 2010, China will implement the 10 Key Energy- Conservation Projects, which is expected to reduce energy consumption by around 240 million tce.* This is expected to reduce CO<sub>2</sub> emissions by about 156 million tons. The 10 Key Energy-Conservation Projects includes oil saving and substitution, coal-firing industrial boiler (kiln) retrofitting, district combined heat & power production, waste-heat and pressure utilization, motor system energy saving, energy system optimization, energy saving in buildings, green lighting, energy saving in government institutes and energy saving monitoring and technological service system projects. In 2006 and 2007, this comprised 10.1 million tce and 25.5 million tce respectively.
- *Between 2006 and 2010, China aims to reduce 100 Mtce through its "Top 1,000 Enterprises Energy-Saving Programs"<sup>17</sup>.* In 2006, China's National Development and Reform Commission (NDRC) took the lead in initiating a "Top 1,000 Enterprises Energy-Saving" program<sup>18</sup> in energy intensive industries, including steel, nonferrous metals, coal, power, petroleum and petrochemicals, chemical industry, building materials, textiles and paper. These 1,000 enterprises comprise 33% of the country's overall energy consumption, and about 47% of industrial energy consumption. By 2007, 998 enterprises signed the "Agreement on Goals and Responsibilities for Energy Saving," representing a reduction in energy consumption of 38.17 million tce<sup>19</sup>.
- *Between 2006 and 2010, China aims to reduce energy consumption in the buildings by around 120 million tce<sup>20</sup>, reducing 400 million tons of CO<sub>2</sub>e accordingly.* This includes: for all new building, implementing a 50% energy-efficiency building code; implementing a 65% energy-efficiency building code in the north of the country and in the four municipalities and establishing a related technological support system; completing 100 green and low energy-consumption building demonstration projects; for all existing construction, implementing energy efficiency retrofitting, which includes, in particular, up to scale application of renewable energy in all existing construction; and improvement of energy saving technologies and standards for existing buildings.

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<sup>17</sup> [http://big5.gov.cn/gate/big5/www.gov.cn/jrzq/2006-04/13/content\\_253464.htm](http://big5.gov.cn/gate/big5/www.gov.cn/jrzq/2006-04/13/content_253464.htm)

<sup>18</sup> <http://www.ccchina.gov.cn/cn/NewsInfo.asp?NewsId=14213>

<sup>19</sup> [http://news.xinhuanet.com/politics/2008-09/06/content\\_9804959.htm](http://news.xinhuanet.com/politics/2008-09/06/content_9804959.htm)

<sup>20</sup> [http://news.xinhuanet.com/fortune/2008-05/14/content\\_8168639.htm](http://news.xinhuanet.com/fortune/2008-05/14/content_8168639.htm)

- *Between 1980 and 2005, China's afforestation efforts have helped to absorb around 3.06 billion tons of CO<sub>2</sub>, its forest management efforts around 1.62 billion tons. A decrease in felling has reduced emission by 430 million tons. Since the initiation of the Six Key Forest Projects, around 20 million hectares have been reforested. Forest coverage in China is currently around 18.2%. On this foundation, China hopes to increase its forest coverage to 20% by 2010. At the same time, it looks to establish a China Green Carbon Fund and actively implement CO<sub>2</sub> sink projects in the forestry industry that aim to increase the carbon storage capacity. This includes afforestation and forest protection projects. According to estimates, these projects will be able to absorb 5-10 million tons of CO<sub>2</sub><sup>21</sup>.*

#### **4. China's Needs and Provisions in Response to Climate Change**

##### *I. Improving Policy Legislation*

China's legislative institutions have successively instituted and revised a number of laws related to climate change, including the "Cleaner Production Promotion Law" of 2002, the "Renewable Energy Law" of 2005, the "Energy Conservation Law" of 2007 and the "Circular Economy Promotion Law" of 2008. In June, 2006, China also put forth "China's National Climate Change Programme." At the same time, the central government as well as all levels of local government passed a set of regulations and legislation on production, taxation, credit and investment. In August 2007, the Chinese government set up an award policy for energy efficient technology innovation, according to which CNY200-250<sup>22</sup> will be awarded for each tce saved. All this suggests that China has a functioning legal system equipped for dealing with climate change.

##### *II. Strengthening Administrative Governance*

Since 1990, the Chinese government has begun to set up institutions specifically designed for dealing with climate change. Since these institutional reforms, both the central government as well as local governments have continued to strengthen organizational development to this end. Under the leadership of the Chinese government, institutions at all levels have been required to set up thorough management and coordination systems and specialized institutions for responding to climate change. These include an energy conservation center at the provincial administrative level responsible for implementing national policies and measures on energy conservation and

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<sup>21</sup> <http://www.oilnews.com.cn/zgsyb/system/2007/07/24/001112268.shtml>

<sup>22</sup> Please refer to "Interim Procedures on Financial Management of Financial Prizes for Energy Conservation Technological Innovation"



efficiency and emission reduction, which includes guidance and coordination of lower level institutions. Furthermore, China has established a target and responsibility management system designated for energy efficiency, which breaks down national targets for energy conservation and efficiency and emission reduction to local governments, and evaluates government officials based on their performance in meeting these targets<sup>23</sup>.

### *III. Increasing Public Participation*

The Chinese government also places great emphasis on public awareness. Under the government's leadership, education on climate change and popularization activities among other activities have been springing up in great numbers, with participation from the government, military, educational institutions, enterprises, research institutions, social groups, non-government organizations and regular citizens. The content mainly includes energy conservation and efficiency in enterprises, changing citizens' consumption habits, volunteer tree planting along with government promotion of a circular economy. In 2005, the "26Degree Campaign" for air-conditioners pushed forward by non-governmental organizations, was initiated in Beijing. The movement was well received throughout the country, and resulted in the establishment of air conditioning regulations in Beijing and other areas across the country. On September 1, 2007, China Central Television (CCTV) put forth a series of activities focusing on citizens' action on conserving energy and reducing emissions during the TV special "The Power of Collective Action." It reported, from many angles, on China's actions and policies in response to climate change. At the same time, advertisements related to climate changed appeared in street corners throughout China's major cities.

### *IV. Encouraging Technological Innovation*

Responding to climate change cannot be done successfully without the use of technology. The Chinese government believes that technological innovation and technological transfer lay the foundation and provide the necessary support for combating climate change, and has continued to strengthen its research and development in these areas, including fundamental research and improving China's own innovative capacity. During the 10<sup>th</sup> five-year plan (2001-2005), China's real investment in technology and research exceeded CNY 2.5 billion, and in the 11<sup>th</sup> five year plan will exceed CNY 7 billion, as stated in the white paper. In addition to research and development, China also hopes to cooperate with developed countries in overcoming obstacles in international

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<sup>23</sup> Please refer to "Cases and Methods for Energy Efficiency and Conservation Statistics Monitoring and Evaluation Implementation"

technology transfer, as this is the best short cut for helping developing countries develop environmentally friendly technology. For this purpose, China has published a detailed list of the technology it needs from developed countries in order to realize its technology goals in relation to combating climate change<sup>24</sup>.

#### *V. Promoting International Cooperation*

China is an active participant in international climate talks. However, China has also made climate change an important aspect of major bilateral relations. China has actively initiated joint research and development efforts with international institutions, and has played an active role in international technological cooperation plans. The Chinese government recognizes the authority of the UNFCCC, and sees “Common but Differentiated Responsibilities” as a core principle of international cooperation on climate change. China also believes in the effectiveness of the “Clean Development Mechanism (CDM)” outlined in the Kyoto Protocol, and that it should be improved and further reinstated in 2012. By July 20, 2008, China had 244 registered CDM projects, with an estimated 113 million tons of CO<sub>2</sub> reduced annually<sup>25</sup>, placing it first in the world on this front.

As the largest developing country, China will play a major role in the global fight against climate change. How China deals with its responsibility will be a topic of major global attention.

The white paper China has released discusses four major points:

1. China faces the same threat from climate change as does the rest of the world, and must take action in response.
2. The current situation in China. China is adopting appropriate strategies, goals and channels for responding to climate change, and will continue perfecting its policies, laws and management systems. It approaches slowing down the effects of climate change from a sustainable development perspective.
3. China’s industrial production is a major focal point in its struggle against climate change, and improving energy efficiency, new sources of energy and clean technology are the most effective methods of reducing greenhouse gas emissions.

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<sup>24</sup> Please refer to “China’s National Climate Change Programme”

<sup>25</sup> [http://cn.chinagate.com.cn/development/2007-07/30/content\\_8600140.htm](http://cn.chinagate.com.cn/development/2007-07/30/content_8600140.htm)

4. China's needs in responding to climate change. China's current level of technological development prevents it from quickly realizing its stated goals in combating climate change. It is dependent on international cooperation, and needs developed countries to provide technology and financial support to help it realize these goals.

In terms of economic globalization, China is at the lower end of the production chain. China's export emissions account for 14.5% to 24% of its overall GHG emissions<sup>26</sup>. Although China's per capita GHG emissions is below the world average, China's overall population is large, making it difficult to ignore its overall GHG emissions. The white paper points out that technology transfer and innovation are key in mitigating China's influence on global climate change.

At the same time, sufficient funding and effective financial mechanisms provide a guarantee for realizing the measures China has set out for itself. Xie Zhenhua, director of the NDRC, proposed in the white paper that developed countries set aside 0.7% of their GDP in helping developing countries decrease their GHG emissions. Mr. Xie also suggested that the current economic crisis provides a good opportunity to change people's consuming habits and lifestyles and adjust the economic structure not only in China, but also around the world.

The Kyoto Protocol lays down and also quantifies the goals of developed countries in reducing emissions. However, it lacks a punitive system for countries that don't meet these goals. It does not touch on the intellectual property and costs of technology transferred by developed countries. With the provisional period of the Kyoto Protocol ending in 2012, China and the rest of the world must clarify the specific meaning of the phrase "Common but Differentiated Responsibilities," and design a fairer, more feasible mechanism for international negotiations on climate change in Copenhagen in 2009.

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<sup>26</sup> Directly taken from Deputy Director of the NDRC, Mr. Xie Zhenghua's remarks made during the press conference at the release of China's Policies and Actions for Addressing Climate Change on Oct. 29, 2008.

**Attachment 1: China's Measures and Achievements in Climate Change Mitigation**

<i>Reduction Measure</i>	<i>Reduction Target</i>	<i>Expected Amount Reduced</i>	<i>Current Progress</i>
<i>Per Unit GDP Energy Consumption Target in the 11<sup>th</sup> Five-Year Plan</i>	Reduce energy consumption per unit GDP by 20% between 2005 and 2010	Expected to reduce emission by around 1500 million tons CO <sub>2</sub> e by 2010.	Energy consumption fell by 1.79% and 3.66% in 2006 and 2007 respectively, falling short of the expected 4% annual drop.
<i>Renewable Energy Law</i>	Renewable energy to account for 10% and 16%(including large-scale hydropower) of total energy demand in 2010 and 2020 respectively.	<p>In 2010, wind power, solar power geothermal power and tidal power will account for a reduction in 60 million tons CO<sub>2</sub>e, biomass will account for a 30 million tons CO<sub>2</sub>e reduction and hydropower will account for a 500 million tons CO<sub>2</sub>e reduction.</p> <p>Renewable energy (including large-scale hydropower) will account for 220 million tons CO<sub>2</sub>e of energy consumption, which is the equivalent of a reduction of 550 million tons CO<sub>2</sub>e.</p>	<p>In 2008, China ranked 5<sup>th</sup> in the world for installed capacity of wind power, and ranked 1<sup>st</sup> in the world in solar-heater coverage. The proportion of coal consumption in 2007 fell to 69.4%, from 72.2% in 1980, while the consumption of hydropower, wind power and nuclear power grew from 4% to 7.2% during the same time period.</p> <p>Meanwhile, China is developing biogas, solar cooker and efficient stoves, among other forms of renewable agricultural technology. By the end of 2007, there were 26.5 million household biogas digesters in operation across the country, replacing around 16 million tce, the equivalent of a reduction of around 44 million tons CO<sub>2</sub>e.</p>

<b>Reduction Measure</b>	<b>Reduction Target</b>	<b>Expected Amount Reduced</b>	<b>Current Progress</b>
<i>Increasing the Efficiency of Thermal Power Exchange</i>	Unit coal consumption for thermal power generation units to be reduced to 345gce/kWh by 2020.	Expected to reduce emission by 110 million tons CO <sub>2</sub> e by 2010	In 2007, 553 small thermal power units across the country were phased out, whose total installed capacity amounted to 14.38GW. During the same year, coal consumption per unit generation with the capacity of 6MW or above dropped from 448 gce/kWh in 1980 to 370 gce/kWh.
<i>Development of Nuclear Energy</i>	Nuclear installed capacity to account for 40GW, or around 4% of installed capacity for the entire country.	Expected to reduce emission by 50 million tons CO <sub>2</sub> e by 2010.	New nuclear power stations currently under construction.
<i>10 Key Energy Conservation Projects</i>	Reduce energy consumption by around 240 million tce by 2010.	Expected to reduce emission by 156 million tons CO <sub>2</sub> e by 2010.	10.1 million and 25.5 million tce energy saving capacity in 2006 and 2007 respectively.
<i>Top 1,000 Enterprises Energy Saving Program</i>	Reduce energy consumption by 100 million tce by 2010.		In 2007, 998 enterprises signed the "Agreement on Goals and Responsibilities for Energy Saving," saving 38.17 million tce.
<i>Energy Conservation in the Construction Sector</i>	Reduce energy consumption by 120 million tce by 2010.	Expected equivalent of 400 million tons CO <sub>2</sub> e reduction in emissions	New construction now 50% more energy conserving than old construction. Government has allocated funds for energy conservation renovations in old buildings.

<i>Reduction Measure</i>	<i>Reduction Target</i>	<i>Expected Amount Reduced</i>	<i>Current Progress</i>
<i>Energy Conservation in the Transportation Sector</i>			The government has used policy incentives such as development of public transportation, taxation of heavy-emitting vehicles, reducing taxes for low emitting vehicles and other such market-based approaches to encourage energy conservation at all levels of society.
<i>Forestry Carbon Sequestration</i>			Between 1980-2005, China's afforestation efforts helped to absorb around 3.06 billion tons CO <sub>2</sub> e; forest management efforts have managed to save around 1.62 billion tons CO <sub>2</sub> e; and reduction of deforestation has allowed for a reduction in 430 million tons CO <sub>2</sub> e.
<i>Clean Development Mechanism (CDM)</i>			China ranks #1 in the world for CO <sub>2</sub> emission reduction capacity of its registered CDM projects. Up to July 20, 2008, China had 244 registered CDM projects, with an estimated 113 million tons CO <sub>2</sub> e reduced annually.



## **Global Environmental Institute (GEI)**

**Address:**

Suite 1-401, Building No. 5,  
New World Villa,  
Chongwen District,  
Beijing 100062, China

**Telephone:** 86-10-6708-3192

**Fax:** 86-10-6708-3193

**E-mail:** [gei@geichina.org](mailto:gei@geichina.org)