



Strengthening US-China Climate Change and Energy Engagement

--Recommendations for Leaders and Policymakers in the US and China--

Background

The United States of America (US) and the People's Republic of China (China) are both key players in international efforts to address global warming and global energy security. Indeed, they are by far the two largest emitters of greenhouse gases (GHGs) in the world, together accounting for over 40% of global CO₂ emissions from fossil fuel use,¹ 36% of the world's energy consumption, and 32% of the world's economic output.² Therefore, efforts by these two players over the coming decades to cut greenhouse gas emissions and energy consumption will play a large role in determining the ultimate outcome of efforts to combat global warming. They are, of course, not alone in this effort, but they are *the* critical actors, jointly holding the key to either sustainability or catastrophe.

Since 2006, the US and China have engaged in more direct and regular discussions through the Strategic Economic Dialogue, which included the establishment of the Ten Year Energy and Environment Cooperation Framework. The Framework presently has five priority areas for cooperation (electricity generation, transportation, clean water, clean air, and protecting wetlands and other natural areas) and is establishing a sixth goal focused on energy efficiency. Given the urgent need to curb global warming and the key role that the US and China play in this effort, now is the time to accelerate and deepen these vital efforts at cooperation on climate change by translating them into tangible actions on the ground. It is even more important in the context of the global economic crisis, since efficiency saves money as it saves energy. Fortunately, both governments have announced that a sizeable share of their economic stimulus would go to "green" actions.³

The Natural Resources Defense Council (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 recently worked with a coalition of nearly 30 environmental, science, and conservation groups on a set of recommendations for the Obama transition team on environment and climate change. The recommendations from this coalition—*"Transition to Green"*—include specific proposals for engaging with China on climate change,

¹ 2006 data from the Netherlands Environmental Assessment Agency, <http://www.mnp.nl/en/dossiers/Climatechange/moreinfo/Chinanowno1inCO2emissionsUSAinsecondposition.html>.

² All values are 2005 data, according to data compiled by the World Resources Institute in their Climate Analysis Indicator Tool, <http://cait.wri.org>.

³ An HSBC Global Research report released January 19, 2009 estimated that 16% of the US' stimulus would go to "green investments" and China was planning to invest 34% of their stimulus in these investments.

energy, and other environmental issues.⁴ NRDC also recently partnered with a group of 30 major corporations and nonprofit organizations, the United States Climate Action Partnership (USCAP), to release a “*Blueprint for Legislative Action*,” a detailed framework for US legislation on climate change.⁵ This blueprint recommends a set of energy and climate policies, many of which could be adapted for China, to move the private sector to develop new and advanced energy technologies, secure economic prosperity, and provide businesses and workers with the opportunity to innovate and succeed.

Building upon the policy recommendations and suggestions for US-China cooperation in these reports and NRDC’s experience in China, this paper recommends nine key steps for the incoming Obama administration, US Congress, and leaders in China to strengthen **US-China Climate Change and Energy Engagement**:

1. Engage in serious bilateral meetings on climate change and address the key sticking points to reaching meaningful agreement in Copenhagen in December 2009
2. Establish a US–China forum on climate change strategies that promote green jobs and economic recovery
3. Mobilize the untapped potential of energy efficiency
4. Assist in the deployment of renewable energy sources and technologies
5. Promote low-carbon, high-efficiency vehicles, fuels, transportation systems, and community development
6. Expand research and investment on carbon capture and storage technology
7. Improve greenhouse gas emissions monitoring and data transparency
8. Conduct co-benefit analysis on GHG emissions controls
9. Invest in regular exchanges and sharing of expertise to improve enforcement of environmental law and energy efficiency standards

These recommendations are intended to be a set of actions that can and should be implemented immediately. Some can be completed within one year, while others require longer-term commitments.

Recommendations

1. Engage in serious bilateral meetings on climate change and address the key sticking points to reaching meaningful agreement in Copenhagen in December 2009

President Obama and President Hu Jintao should discuss the efforts of their countries to combat climate change at their first bilateral meeting, preferably to be held in March or April of 2009. This meeting should kick-start a series of high-level bilateral discussions throughout 2009 on the

⁴ American Rivers, Center for International Environmental Law, Natural Resources Defense Council, et al, *Transition to Green: Leading the Way to a Healthy Environment, a Green Economy and a Sustainable Future*, November 2008, http://docs.nrdc.org/legislation/leg_08112401.asp. The international climate portions with commentary here:

http://switchboard.nrdc.org/blogs/jschmidt/actions_to_restore_leadership_on_global_warming.html.

⁵ United States Climate Action Partnership, *A Blueprint for Legislative Action*, January 2009, <http://www.us-cap.org/blueprint>.

concrete steps that the US and China can undertake to reduce their greenhouse gas emissions now and in the future, and the key sticking points that need to be overcome for both parties to sign on to a meaningful international climate change agreement in Copenhagen in December 2009. In particular, the US and China should seek to find common ground on important issues such as the Chinese government's desire for greater access to cleaner, more efficient technologies, the US desire to export green technologies while maintaining intellectual property rights, and the need for both countries to commit to measurable, reportable, verifiable, and appropriate reductions in GHG emissions. One avenue for early discussion is the role of sectoral approaches where specific emission reduction actions are taken in key sectors of the economy, such as electricity and major energy-intensive industrial sectors.⁶ There has been significant discussion of such approaches under the international climate negotiations and these two countries should engage in a serious discussion on their role and key design features.

These ensuing bilateral meetings should be led by high-level officials from each government to ensure that the discussions and outcomes have strong political backing, and should be aimed at delivering concrete actions, rather than merely issuing symbolic joint statements or press conferences.

Any structures agreed upon in these bilateral discussions should be brought into the United Nations Framework Convention on Climate Change (UNFCCC), as this bilateral engagement is meant to support, not replace, the UNFCCC. Bilateral discussions can thus focus on how joint action by the US and China on climate change can stimulate agreements in global climate negotiations that benefit all countries.

The US can and should accelerate this process by taking unilateral action to demonstrate a good faith effort to reduce GHG emissions, e.g., by setting mandatory limits on GHG emissions through new legislation and implementation of existing laws. US action to implement mandatory measures and incentives for reducing greenhouse gas emissions should not be contingent on simultaneous action by China or any other country. On the other hand, US climate action, especially measures that provide access to US greenhouse gas markets and other performance-based incentives, can be a strong incentive for action by China and other emerging economies.

2. Establish a US–China forum on climate change strategies that promote green jobs and economic recovery

Both the US and China are undergoing unprecedented economic challenges and have recognized the importance of using the present economic downturn to transition to sustainable economic development paths through significant investment in energy efficiency, renewable energy, and other green infrastructure. This creates a unique window to create millions of valuable “green jobs” in each country, which will enable the US and China to lead the world in the creation of new, green industries and clean technologies. Developing green jobs and industries will also strengthen the energy security of each country by reducing reliance on imported fossil fuels.

⁶ For example, a forthcoming NRDC discussion paper evaluates some designs of these approaches that could be crucial in ensuring that they are effective and credible.

The proposed economic stimulus packages of both countries include potentially promising “green” components. China disclosed a US\$585 billion (RMB 4 trillion) stimulus package that proposes at least US\$51 billion (RMB 350 billion) for biological conservation and environmental protection. China’s Ministry of Environmental Protection (MEP) has announced that the stimulus will “not be spent in the energy- and resource-intensive industries or high-pollution industries” and will benefit the renewable energy and pollution control industries. President Obama has also proposed a stimulus package that, in part, creates green jobs through business incentives for alternative energy sources and environmentally friendly technologies.

The foundations of an economic model based on green innovation will consist of robust investment in energy efficiency, green buildings, public transit, advanced pollution control technologies, and renewable energy. Studies, such as a 2007 McKinsey study on energy productivity, show that these kinds of investment make good economic sense.⁷ In both nations, but in China in particular, this new paradigm will also require heavy investment in effective environmental enforcement, including accurate environmental monitoring and reporting, well-trained environmental regulators and enforcement officials, public supervision, and greater transparency. China has made a good start in this regard by proposing to enhance public participation and transparency in the process of spending the stimulus funds, but such efforts need to be sustained over the long term.

The potential for green innovation in China’s economic stimulus package in fact far exceeds what has explicitly been announced, but only if environmental criteria are extended to the whole package. China could, for example, develop criteria to ensure that the 280 billion yuan proposed for housing projects is spent only on green building projects that save water and energy and are located using smart growth principles. The 1.8 trillion yuan proposed for transportation and the power grid should focus on public transit rather than highways, and should ensure that transmission lines are located in areas that will enable China to tap its abundant renewable energy resources. And research and development (R&D) and innovation projects should focus on clean energy, advanced transportation, and energy and water efficiency technologies. The stimulus package could also include funding for a comprehensive program of skills development and worker placement to train unemployed workers for green jobs, such as industrial energy auditors and building energy code inspectors.

Similar efforts should be made to incorporate green innovation into all aspects of the US stimulus package. NRDC and others have proposed, for example, a more than US\$30 billion energy savings plan that includes energy efficiency retrofits, construction of an improved electricity grid, strengthened energy efficiency standards, policy reforms, training, and more efficient power plants.⁸

The US and Chinese economies are inextricably intertwined, so any hope of economic recovery requires joint action. There are enormous opportunities for both the US and China to cooperate in the development of strategies that will jump-start the global economy, create green jobs, and

⁷ McKinsey Global Institute, *Curbing Global Energy Demand Growth: The Energy Productivity Opportunity*, May 2007, http://www.mckinsey.com/mgi/publications/Curbing_Global_Energy/index.asp.

⁸ A. Wang and B. Finamore, “China US Green Vows Need Action,” *China Daily*, January 19, 2009, http://www.chinadaily.com.cn/bw/2009-01/19/content_7407561.htm.

protect the climate. Some immediate steps to leverage both countries' economic stimulus packages could include cooperation on the development of:

- Performance-based criteria for directing economic stimulus investments towards green infrastructure and clean energy;
- Joint Industrial Assessment Centers that provide free energy audits and recommendations to industrial facilities while training people in both countries to perform these skills;
- Programs to train displaced or unemployed workers in both countries to become building efficiency auditors and building code inspectors, coupled with funding for building efficiency retrofit programs;
- Funding programs for state and provincial governments that adopt and implement plans for improved enforcement of building energy codes and for reduction of vehicle miles traveled;
- Incentive mechanisms and policy reforms that will leverage private investment and unleash innovation; and
- Joint programs to improve environmental monitoring and reporting, training of environmental regulators and enforcement officials, public supervision and greater transparency.

More ambitious efforts could include the establishment of “green” special economic zones (SEZs) in China and the US aimed at fostering the growth of companies manufacturing energy efficient products and technologies, renewable energy technologies and other related products. The SEZs would provide tax incentives, infrastructure, and special policies to encourage the growth of these preferred green industries. These would utilize the highly successful model of China's export-oriented SEZs like Shenzhen, which have transformed China into a global manufacturing powerhouse, and harness the model in the service of greater economic prosperity *and* environmental protection. Demand for investment in these green SEZs would be driven by US demand for “green” technologies in turn spurred by Obama's green stimulus. China's green stimulus can also expand the market in China for products produced in these green SEZs. Robust demand in both nations and the rest of the world will help drive these industries to scale, pushing down costs and accelerating the ultimate implementation of low-carbon, green technologies.

China and US bilateral cooperation can spur changes to the global system that increases demand for green technologies in other countries as well. To maximize the potential for such cooperation, China and the US should create:

- A high-level forum to share lessons and explore opportunities for cooperation on promoting green jobs and industries and investment in sustainable infrastructure. This forum should include input from states and provincial government officials, business leaders, scientists and engineers, labor representatives and NGOs.
- City-to-city exchanges on experience in low-carbon practices, including industrial, commercial and residential energy efficiency, green transportation and city planning, and promotion of green jobs. The EcoPartnerships Program established as part of the Strategic Economic Dialogue between China and the US has begun to implement this concept (e.g., Denver, Colorado and Chongqing; Port of Seattle and Dalian Port

Corporation; Wichita, Kansas and Wuxi City, Jiangsu, etc.). These efforts should be continued and expanded.

- Study groups of policymakers and technical experts to share the most effective implementation ideas on a variety of topics, including energy efficiency in buildings, industry, power generation, transmission, and transportation vehicles, as well as transportation and land use planning and the use of economic incentives to reduce the demand for travel. These groups could explore how best to create “green jobs” that can tap into these opportunities.
- Future meetings to focus on the development of large-scale energy efficiency incentive programs (such as demand-side management, which NRDC has pioneered in China); renewable energy technology development and manufacturing; improved electric batteries and storage technologies; mass transit infrastructure and smart growth planning; and smart grids and electricity infrastructure.

3. Mobilize the untapped potential of energy efficiency as a resource

The work of NRDC and others has shown that despite much progress, there is still enormous potential for improving energy efficiency in both the US and China. A McKinsey Global Institute study, for example, found that a global effort to boost efficiency using existing technologies with an internal rate of return of at least 10% could eliminate more than 20% of world energy demand by 2020.⁹ Moreover, making businesses, homes, and industries more energy efficient is cheaper and more cost-effective than investment in new power plants. Energy efficiency should thus be a top priority for both countries to reduce GHG emissions because it pays for itself. Too often, however, the long-term benefits to be gained through investments in energy efficiency are unrealized because of financial, market, and regulatory barriers to deployment of energy efficiency at scale.

Both countries have important experience to share on energy efficiency. China has made efficiency a national priority and has developed a number of innovative policies, programs, and incentive mechanisms, though capacity building to implement them is desperately needed. In the United States, the Department of Energy and the Environmental Protection Agency facilitated the *National Action Plan for Energy Efficiency* which presents policy recommendations for creating a sustainable, aggressive national commitment to energy efficiency through gas and electric utilities, utility regulators and partner organizations such as NRDC.¹⁰ These organizations have pledged to take specific actions to make the Action Plan a reality, though much work remains to be done.

To capture the enormous and largely untapped reserves of energy efficiency in both countries, we recommend that the US and Chinese governments work together—and with states, provinces, grid companies, energy service companies, NGOs and other stakeholders—to implement the recommendations in the National Action Plan and share experiences and develop policies and programs that will:

⁹ McKinsey Global Institute, *Curbing Global Energy Demand Growth*.

¹⁰ US Department of Energy, US Environmental Protection Agency, *National Action Plan for Energy Efficiency*, <http://www.epa.gov/cleanenergy/energy-programs/napee/index.html>.

- *Treat energy efficiency as a high priority energy resource.* Both countries should require grid companies to develop and implement cost-effective energy efficiency programs that contribute to national energy efficiency objectives. The delivery of energy savings should be made an important evaluation criterion of grid companies' performance. Pricing reforms, incentive funding, and tariffs should be used to make energy efficiency profitable for grid companies and to place energy efficiency on an equal footing with conventional power production.
- *Integrate energy efficiency in power sector reform, resource planning, and investment decisions.* Governmental jurisdiction over energy efficiency should be consolidated, strengthened, and fully integrated into utility, state/provincial, and regional power supply planning. Long-term energy savings goals should be developed as part of each of these energy planning processes and should be updated frequently. The US and China should work together to develop robust procedures for measuring and verifying energy savings and evaluating energy efficiency programs.
- *Provide sufficient, timely, and stable program funding to deliver energy efficiency where cost-effective.* Demand-side management (DSM) programs, already ongoing on a limited scale in both countries, should be scaled up dramatically to promote large-scale, planned investments in energy efficiency to reduce overall demand for electricity and avoid the need to build new power plants. DSM programs may be funded by a small ratepayer charge on each electric or gas bill, and are targeted to provide financial assistance to businesses and consumers to improve the energy efficiency of their factories, businesses, and homes. These programs can be administered by utilities, state/provincial governments, or independent third parties. Capacity building should be an essential part of this effort.
- *Work to increase opportunities for financing of energy efficiency.* Under the Ten Year Energy and Environmental Framework, the US Trade and Development Agency and the US and Chinese Export-Import Banks are working to increase financing opportunities for energy efficiency investments involving US exports. The US and China should also work to increase dialogue between private sector banks in the US and China that are supporting energy efficiency investments, and help to strengthen the role of energy service companies (ESCOs) in financing and implementing energy efficiency investment.
- *Provide other regulatory and tax incentives.* The US and China should also cooperate in identifying other regulatory tools for encouraging energy efficiency investments, including tax incentives and grants for energy efficiency investments (perhaps funded through the sale of carbon credits) and energy efficiency portfolio standards.
- *Focus on industrial sector energy efficiency improvement measures in order to revitalize US manufacturing while also reducing emissions related to manufactured goods produced in China for both domestic consumption and export to the US.* The

industrial sector consumes two-thirds of China's energy, and adopting successful practices to improve industrial energy efficiency in both countries can result in significant environmental and economic benefits. The focus should be on (1) hands-on capacity building designed to adapt and implement successful industrial energy efficiency policies and programs; (2) development of appropriate protocols and training for energy audits, program evaluation, monitoring, reporting, and verification; (3) incentives and other measures to accelerate large-scale dissemination of energy efficient technologies; and (4) increased R&D investment on advanced energy efficiency technologies and materials.

- *Capture the enormous energy efficiency potential of buildings through interlocking mandatory and market-based programs, and strengthened enforcement.* Since 2000, the floor space of China's new buildings has been growing at a rate of nearly 2 billion square meters every year. At this rate, the energy consumed by buildings in China could reach 1.1 billion tons of standard coal equivalent by 2020, assuming no improvements to building energy performance.¹¹ In the US, commercial and residential buildings in 2005 accounted for about 40 percent of national energy consumption, 70 percent of electricity consumption, and the largest share of global warming pollution in the United States.¹² We recommend that the US and China explore opportunities for cooperation in the development of comprehensive building and appliance efficiency programs that include the following elements: (1) mandatory building codes and equipment and appliance standards that are updated on a regular and aggressive basis; (2) national performance-based incentives for buildings, equipment and appliances that outperform the minimum mandatory requirements; (3) tax and regulatory policies that encourage consumers to purchase and manufacturers to deploy highly efficient technologies; (4) common protocols for measuring and accounting for energy reductions and associated greenhouse gas benefits, (5) rewards for states/provinces that demonstrate faster progress; (6) expansion of building energy rating and labeling systems so that energy and location efficiency are considered part of the ordinary lending process; and (7) creation of independent, certified third-party energy rating communities to supplement government code enforcement efforts.
- *Share data on the energy performance and cost of key appliances.* Chinese and US manufacturers should voluntarily provide data to the US Department of Energy in rulemakings when requested by DOE or NGOs. Exchanging non-proprietary data in a transparent manner can help each country ensure that its efforts to push appliance efficiency are informed by the "state of the art" available technologies. Part of this effort should involve comparisons of each country's test methods and how they affect rated performance.

¹¹ R. Jin and R. Fan, "Building Energy Efficiency in China," *Ecology Law Quarterly*, Vol. 35: 108, October 2008, http://boalt.org/elq/PDF/C35.03_02_JIN_08.10.30.pdf.

¹² L. Burt and J. Presswood, "Unlocking the Power of Energy Efficiency in Buildings," NRDC Issue Paper, December 2008, <http://www.nrdc.org/energy/unlocking.pdf>.

4. Assist in the deployment of renewable energy sources and technologies

In addition to reducing the demand for energy, the US and China should engage in closer, larger, and wider collaboration to speed up the deployment of renewable energy. Both countries have large untapped resources and technical potentials. The US possesses state-of-the-art renewable energy technologies, including wind, solar, biomass and geothermal. China in recent years has become not only the world's largest supplier of solar panels, but also the largest user of solar hot water systems, installing 80% of all new solar hot water heater systems worldwide in 2005.¹³ China has also adopted ambitious renewable energy development goals, but meeting these goals requires more aggressive investment in research and development, and deployment.

To help speed up the deployment of renewable energy technologies in both countries, we recommend that the US and China:

- Increase regular exchange on specific renewable energy development topics, including technical, policy, investment, and manufacturing aspects;
- Cooperate on joint R&D on advanced renewable energy technologies, such as high performance thin-film photovoltaics (PV), enhanced geothermal systems, cellulosic ethanol, and algae-based fuel;
- Facilitate joint venture commercial-scale projects in China on renewable energy production; and
- Share experiences on both successes and lessons learned regarding rapid scale-up of renewable energy technologies. The US, for example, should review China's experience and expand installation of solar hot water heaters through rebates and state and federal tax credits, and by requiring solar hot water heaters on new homes where appropriate. California, for example, has a \$250 million rebate program for solar water heaters, and Hawaii requires all new single family homes to install solar hot water heaters starting in 2010.

5. Promote low-carbon, high-efficiency vehicles, fuels, transportation systems, and community development

China and the US both have successes to share on measures to reduce GHG emissions from the transportation sector. China enacted fuel economy standards that are tougher on sport utility vehicles than those in the US, raised pump prices in Beijing to fund cleaner fuel, and recently launched the world's first production plug-in hybrid electric car. In the US, California has led the way with a suite of transportation policies, standards and incentives designed to reduce transportation-related GHG emissions. President Obama has moved quickly to direct the EPA to immediately review requests from California and other states to set global warming pollution standards for new cars. He also directed the Department of Transportation to set higher national fuel efficiency standards.

¹³ Environment California Research and Policy Center, *Solar Water Heating: How California Can Reduce its Dependence on Natural Gas* (April 2007) at 4, http://www.environmentcalifornia.org/uploads/at/56/at563bKwmfrtJI6fK19U_w/Solar-Water-Heating.pdf.

We recommend that the US and China share lessons and explore opportunities to strengthen cooperation on the development of technologies and programs that will reduce transportation-related GHG emissions. Such cooperation could cover areas including: (1) the development of advanced technologies such as plug-in hybrids, battery electric vehicles, and fuel cell technologies, (2) appropriate methodologies for determining lifecycle carbon intensities of various transportation fuels; (3) strengthened fuel economy standards; (4) incentives for encouraging fuel efficiency retrofit technologies; (5) policies and incentives to reduce vehicle miles traveled through smart growth development that integrates building and transit, and (6) reducing GHG emissions from freight hauling through intermodal efficiencies, clean and efficient ports (such as the LA port model NRDC helped to pioneer), and more efficient long-haul freight trucks.

6. Expand research and investment on carbon capture and storage technology

Coal is a significant source of electricity generation in both countries — accounting for nearly 80% in China¹⁴ and nearly 50% in the US for electric power generation.¹⁵ Coal-based electricity generation accounts for a large share of both countries' CO₂ emissions, yet coal is forecast to be a part of both countries' energy mix in the near term. Efforts are ongoing in both countries to support carbon capture and storage (CCS) research and development, but they are not large enough and fast enough in light of the climate challenge we all face.

For example, reducing current US carbon emissions by 80 percent by 2050 would require CCS of 1.1 billion tons of CO₂ per year just to fulfill 10 percent of that reduction target.¹⁶ And for China, whose carbon emissions are predicted to more than double by 2050 under a business-as-usual scenario, leveling its emissions 40% above its current level would require multiple aggressive measures, including a similar level of CCS as in the US example. Accelerated R&D and field demonstrations on CCS, therefore, need to be significantly sped up and scaled-up if CCS is to become a cost-effective, environmentally credible, and safe option for making deep carbon emissions reduction. We therefore recommend that the US and China:

- Set up a joint CCS Advisory Group or program to lead the studies and development of CCS technical and legal standards for China, learning from the ongoing efforts in the US;
- Launch capacity building efforts in China on site selection, evaluation and monitoring;
- Work together to develop respective roadmaps on CCS deployment;
- Initiate a joint public forum to promote, communicate and educate on CCS; and
- Establish a US-China Fund on CCS aimed at developing and financing large-scale demonstration projects in China for enhanced oil recovery and storage in deep saline aquifer.

¹⁴ China Electricity Council data for 2008, available at: <http://www.cec.org.cn/html/news/2009/1/5/2009151635506199.html>.

¹⁵ Energy Information Administration data for 2007, available at <http://www.eia.doe.gov/cneaf/electricity/epa/figes1.html>.

¹⁶ R. Duke and D. Lashof, "The New Energy Economy: Putting America on the Path to Solving Global Warming," NRDC Issue Paper, June 2008, <http://www.nrdc.org/globalwarming/energy/economy.pdf>.

7. Improve greenhouse gas emissions monitoring and data transparency

Both the US and China have systems in place to collect data on energy, air pollution, and GHG emissions from key sources such as power plants and major industrial sources. Accurate and transparent reporting of GHG emissions data is necessary to evaluate policies for reducing GHG emissions and to measure progress. However, China does not regularly release GHG emissions data, and there are perceived weaknesses in the quality and transparency of Chinese energy and emissions data. The two countries also have different statistical standards that make data interpretation and comparison relatively difficult.

Improving the transparency, quality, and frequency of GHG emissions inventories will be a cornerstone of a strong international climate agreement to be reached in Copenhagen. Under the UNFCCC, developed countries are required to follow an established set of guidelines for their GHG inventories. These inventories are to be produced yearly, so there is a regular update on the trends in countries and they are subject to international review. A different set of rules are required for developing countries. These developing country inventories are not currently produced as frequently.

Lack of credible and transparent GHG data creates distrust and stymies the ability to implement effective policies to address a number of the areas for improvement identified in these recommendations. In order to improve the quality of available data and enhance mutual trust, we therefore recommend that the US share its experience on collecting, monitoring, and sharing GHG emissions data and the US and China develop ways for both countries to collect, monitor and report data on energy, air pollution, and GHG emissions.

8. Conduct co-benefit analysis on GHG emissions controls

The threats posed by severe climate change include rising sea levels that endanger coastal cities and industries, reduced agricultural productivity, increased risk of disease, increase in severe weather events, damage to ecological systems, loss of habitat and threats to biological diversity. Reducing greenhouse gas emissions can help mitigate the impact of these effects on socio-economic development and human welfare. The US and China should fund research to analyze the co-benefits of reducing GHG emissions in China, including a cost-benefit analysis of the options for mitigating and adapting to the effects of climate change. They should also share strategies for adapting to climate change and identifying the areas and sectors most at risk.

9. Invest in improved enforcement of environmental laws and energy efficiency standards

No nation has successfully tackled its environmental problems without a solid foundation in the basic building blocks of environmental enforcement, including clear environmental legislation, robust information gathering and reporting systems, well-trained enforcement and regulatory staff, sufficient budget, public participation, and measures to promote compliance (such as training, financial incentives, etc.). These elements of an effective environmental enforcement regime can be established relatively quickly with sufficient political will, funding, and technical

resources (as was the case in Japan and the US in the 1970s). The US has faced serious challenges in many aspects of its environmental regulation over the years and can share experiences to help China avoid the mistakes made in the US. We recommend the establishment of regular exchanges and sharing of expertise to provide resources and incentives to help Chinese provincial, municipal, and local governments to build capacity in the enforcement of environmental laws and energy efficiency standards and codes.

The market for environmental technologies requires an effective system for enforcing laws and standards. A sound and reliable environmental enforcement system will spur reliable demand for environmental services. The US and China should share experiences on combining command-and-control mechanisms with market and compliance measures to improve adherence to critical energy efficiency and emissions standards. Both governments should encourage and support collaboration with business in China and the US to incorporate information on energy efficiency compliance into market transactions, such as through making energy ratings (which are already part of the energy code compliance process) part of the permanent record of a building. Serious commitment to rule of law and enforcement of laws, such as intellectual property laws, will help pave the way for greater exchange of technology as well.

The US Environmental Protection Agency and China's Ministry of Environmental Protection have already commenced collaborations on environmental governance and enforcement. These collaborations, and further collaborations with advisory groups such as NRDC, academic institutions and research laboratories should be deepened, encouraged, and financially supported.

Conclusion

The US and China are at a crucial juncture in how they are going to shape their economies, position their companies and technologies for the 21st century, and address global warming. Action must be taken in both countries immediately if these countries and the world are to avoid the worst impacts of climate change.

Fortunately there are huge opportunities for those countries and companies that lead. Making smart investments and changing policy today can create new jobs at a time of economic challenge in both countries. In addition, these choices and actions will position each country to be a leader in the economy of the 21st century.

These nine overarching actions and the many underlying specific steps will not solve by themselves the global warming challenge. Likewise taking these actions won't address all the challenges of getting a strong international agreement to address global warming. But they can make a huge down payment.

The US and China do not have to start from scratch in these efforts. Many of them are already being undertaken with varying levels of effectiveness and support. However, to be effective the US and China will need a stronger political commitment from the heads of government, scaled-up resources, and focused efforts to ensure that the actions are delivered on the ground in each country. It can and must be done. And it needs to begin immediately.

APPENDIX

About NRDC

NRDC (Natural Resources Defense Council) is one of the most effective nonprofit environmental organizations in the United States. Established in 1970, NRDC uses law, science and the support of 1.2 million members and online activists to protect the planet and ensure a safe and healthy environment for all living things. NRDC's staff of more than 350 lawyers, scientists and policy experts work out of offices in New York, Washington, Chicago, Los Angeles, San Francisco and Beijing.

NRDC works to solve the most pressing environmental issues we face today: curbing global warming, getting toxic chemicals out of the environment, moving America beyond oil, reviving our oceans, saving wildlife and wild places, and helping China protect its environment while continuing its strong economic development.

NRDC's Work in China

For more than twelve years, NRDC has been working in China with local partners to address some of the world's greatest environmental challenges and help create innovative solutions for a cleaner, healthier environment and curbing global warming. Our work in China builds on our longstanding expertise in the United States and elsewhere in the areas of energy, health, market transformation and environmental enforcement. NRDC's primary role in China is to support leading domestic efforts on energy conservation and environmental protection. We believe that successful, sustainable efforts at energy conservation and environmental protection must be driven from within China and are proud that NRDC has been on the ground in Beijing and around the country to help accelerate these efforts. To this end, we have partnered with the key actors in China's government, academia, non-governmental organizations, and legal community to help promote cutting-edge energy and environmental solutions for China. NRDC is also partnering with the private sector, including multinational corporations, to help promote supply chain practices that contribute significantly to solving China's environmental problems.

Spurring a Shift to Greener Buildings

NRDC was the first international environmental organization to establish a clean energy program in China, and over the last decade, our team of experts has helped China develop clean, efficient, and affordable environmental strategies. NRDC's long-term partnership with the Lawrence Berkeley National Laboratory led to the development of China's first national commercial building energy-efficiency standard, which requires all new commercial buildings to cut energy use by 50 percent. We're also making sure that residential buildings meet aggressive environmental benchmarks by setting energy standards for two of China's three major climate zones: the Transition Zone, which covers the entire Yangtze River Basin, and the southern Cooling Zone, which includes Guangdong Province [Canton], China's fastest-growing economic region. And because we know that setting standards is only half the battle, NRDC is working with Shanghai- and U.S.-based partners to ensure that these groundbreaking standards are

properly implemented through the use of pathbreaking building energy labeling systems and independent building rater certification systems.

Promoting Energy- Saving Technologies

The cheapest, easiest, and fastest way to reduce the staggering pollution from China's power plants is to increase energy efficiency. That's why NRDC and the China-U.S. Energy Efficiency Alliance are working to develop incentive programs, known as demand side management (DSM), that will help China improve its efficiency. Research shows that DSM programs -- which allow utilities to use a portion of their revenues for rebates and other incentives to encourage customers to take advantage of energy efficiency -- could meet up to half of China's forecast load growth over the next decade. Moreover, these efficiency "negawatts" can be deployed rapidly and typically cost one-quarter to one-half as much as investments in traditional power supplies.

We helped organize the first DSM forum in China, bringing together representatives from national and provincial government agencies and utilities to discuss energy saving opportunities. Our efforts to help Jiangsu Province develop the nation's first large-scale DSM pilot program caught the attention of China's Premier Wen Jiabao and Vice Premier Zeng Peiyan. They not only cited Jiangsu's program with approval, but also submitted it to the State Energy Office with instructions to promote it as a national model. We have now completed a nationwide DSM Implementation Manual under the sponsorship of the National Development and Reform Commission, and will use it as the basis for a nationwide training program that will kick off in late February 2009.

Improving the Energy Efficiency of Chinese- Made Products

With Chinese manufacturers dominating many world markets, improvements in the energy efficiency of products made in China can deliver benefits in the United States and across the globe. For example, more than 75 percent of external power supplies -- those black boxes used to convert incoming AC power to the DC power needed by electronics -- are manufactured in China. Unfortunately, most of these power supplies are relatively inefficient; NRDC estimates that the United States could reduce its electricity consumption by 1 percent to 2 percent simply by moving to more efficient power supplies.

Working on the first-ever joint project between the United States and China to coordinate the testing methods and performance measures for a product, we helped establish a single worldwide specification for external power supplies that has been adopted on a voluntary basis in China, Australia, and the United States. In the next few years, this specification will become mandatory for all external power supplies sold in China.

Promoting IGCC and CCS Development and Deployment in China

Over the past three years, NRDC has worked hard to promote the development of coal gasification capacity building and increase the Chinese government's attention to carbon capture and storage (CCS). We have supported Chinese experts to study the technical, institutional and regulatory barriers to polygeneration development, advocated the government to increase attention to coal gasification-based co-production, and helped the Chinese government draw up a roadmap for the demonstration and commercialization of coal gasification, IGCC, and co-production technologies.

Our work and that of others have catalyzed noticeable progress in China. China's National Medium to Long Term Program for Science and Technology Development (2006-2015) includes coal gasification and co-production as key areas for research, development and demonstration. The roadmap on coal gasification that Chinese experts developed with our support provides timely and major inputs for China's 11th Five-Year Plan (FYP) on Science and Technology Development. In accordance with the plan, China is building the country's first group of industrial scale IGCC/co-production demonstration facilities during the current five-year plan period. These plans for industrial demonstration will be an essential stage for achieving cost reduction, technology maturity, and eventual widespread application of IGCC. The Ministry of Science and Technology of China also has begun to support research projects on CCS, an area in which China did not want to previously focus on due to political considerations, revealing another sign of important progress occurring in China.

We have supported the Institute of Engineering Thermophysics, Chinese Academy of Sciences in a cost analysis of various IGCC/coproduction processes and a baseline study that identified gaps between commercialized power generation systems (ultra-supercritical, circulating fluidized-bed, and pulverized coal systems) and IGCC/co-production systems under Chinese conditions in terms of scale, efficiency, coal requirements, and capital and production costs.

Pushing for Cleaner Cars

Private car sales have been surging in China, leading to increased global warming pollution from emissions and greater oil dependency for the nation. NRDC has been making sure that the trend toward more cars on the road does not come at a steep environmental cost. In Shanghai, we have successfully encouraged the formation of a public-private partnership for clean vehicle commercialization, a relatively new concept for China. The founding members of the partnership include Chinese subsidiaries of major multinational automakers, as well as Chinese companies and academic institutions. This nonprofit partnership is hard at work organizing forums and seminars, supporting college students conducting an energy policy research project, and building China's first hydrogen fueling demonstration station in Shanghai.

Strengthening the Law and Increasing Public Participation

In 2007, the Chinese government began developing an overarching energy law that will provide the foundation for more specific energy laws and regulations. Recognizing this unique opportunity for promoting sustainable energy policies in China, NRDC teamed up with the China Sustainable Energy Program of the Energy Foundation and the Law School of China's Tsinghua University to provide recommendations for this groundbreaking law. Encouragingly, the draft version of the China Energy Law has given energy conservation and efficiency the highest priority and included general provisions on low-carbon fuels, renewable energy, and public participation in energy decision-making.

China is also in the process of amending its primary law on air pollution. NRDC is working with the China Sustainable Energy Program of the Energy Foundation and other partners to provide recommendations on this critical piece of legislation. Key areas of focus will be improved coordination between air pollution regulation and China's energy sector, strengthening of

foundational regulatory mechanisms like standards, permitting and total emissions control, and improved enforcement mechanisms.

To encourage the public to play a greater role in environmental protection, our staff in Beijing is working with local partners to conduct environmental law trainings for NGOs, community groups, and journalists. We also helped develop and launch China's first online resource devoted to environmental law, policy and public participation (<http://www.greenlaw.org.cn>). The website analyzes key developments in China's environmental governance and arms citizens with how-to guides to getting involved, along with localized information about their region's environmental initiatives.

Promoting Responsible Sourcing

NRDC and its partner, The Council of Fashion Designers of America, are spearheading a multiphased initiative called *Clean By Design*. *Clean By Design* aims to revolutionize the way the textile industry operates, by connecting design choices to manufacturing consequence and fostering innovation at the factory-level. In phase one of the initiative, completed in 2007, NRDC's review of factory performance in China identified textiles as a major polluter. In phase two, in 2008, our experts audited a typical Chinese textile factory, investigating the use of water, materials, and energy to find cost-saving methods that would increase efficiency and lower the factory's footprint. We are conducting additional factory audits before compiling best practices for pollution prevention and efficiency opportunities for the industries. Phase three, slated for spring 2009, will bring together world-class designers to discuss choices for fiber, dye, consumer care, and more, to minimize impacts of manufacturing. Factory performance opportunities will also be reviewed. The final phase will culminate in supply chain recommendations for multinational retailers, brands, designers and policy recommendations to China's government officials to revolutionize the textile supply chain. NRDC is confident that this multifaceted strategy will help the apparel industry keep up with the pressing pace of global industrial growth, while ensuring that sound environmental practices are adopted.