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Global Solutions to Global Warming

Recommendations for Leaders and Policy Makers in the United States and China

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About NRDC

The Natural Resources Defense Council (NRDC) is an international nonprofit environmental organization with more than 1.2 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC has offices in New York City; Washington, D.C.; Beijing, China; Los Angeles; San Francisco; Montana; and Chicago. Visit us at www.nrdc.org.

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Executive Summary

Two nations play a vital role in efforts to curb global warming and secure the world's energy supply: The United States of America and the People's Republic of China. Together, they account for more than 40 percent of global carbon dioxide emissions from fossil fuel use,¹ more than 35 percent of the world's energy consumption, and more than 30 percent of the world's economic output, making their involvement in addressing the global warming crisis critical.² As both nations suffer through tough economic times and commit to extraordinary economic stimulus packages, we are presented with an excellent opportunity to turn promises into real action.³ NRDC recommends nine key steps for the Obama administration, the U.S. Congress, and leaders in China to strengthen U.S.–China climate change and energy engagement at this unique time.

Given the urgency of fighting global warming, we urge that all of the recommendations be implemented immediately. Some actions can be completed this year, to establish a sound basis for mutual cooperation and understanding ahead of the Copenhagen negotiations, while others may take one to three years to fully get off the ground:

1. Engage in serious bilateral meetings on global warming, and address the key sticking points to reaching meaningful agreement in Copenhagen in December 2009.
2. Establish a U.S.–China forum on climate change strategies that promotes green jobs and economic recovery.
3. Mobilize the untapped potential of energy efficiency as a resource.
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. Participate in regular exchanges and sharing of expertise to improve enforcement of environmental law and energy efficiency standards.

These policy recommendations are based on NRDC's experience working in China for nearly 15 years and almost 40 years in the United States. They build upon three pivotal frameworks developed since 2006: the U.S.–China Ten-Year Energy and Environment Cooperation Framework; an Obama transition team report on the environment and climate change, *Transition to Green*, produced by a coalition of nearly 30 environmental, science, and conservation groups;⁴ and a detailed framework for U.S. legislation on climate change called "Blueprint for Legislative Action" released by another collaborative effort called the United States Climate Action Partnership (USCAP).⁵

Recommendations for U.S.-China Action on Global Warming

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 global warming at their very first bilateral meeting and make energy and climate change a centerpiece of bilateral cooperation. This meeting should follow a series of high-level bilateral discussions throughout 2009 on the concrete steps that the United States and China can undertake to reduce their greenhouse gas emissions now and in the future, and on the key sticking points that need to be overcome for both parties to sign a meaningful international climate change agreement in Copenhagen in December 2009. In particular, the United States 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 United States' desire to export green technologies while protecting 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 a sectoral approach, in which developing countries would take specific emission-reduction actions in key sectors of their economies, such as electricity and major energy-intensive industries, in exchange for technology and financial assistance.⁶ There has been significant discussion of such an approach during the international climate negotiations leading to Copenhagen, and the United States and China should engage in bilateral discussions on their potential roles and key design features.

These bilateral meetings should be led by high-level officials from each government to ensure that the discussions and outcomes have strong political backing. They should be aimed at delivering concrete actions rather than merely issuing symbolic joint statements or holding 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 United States and China on climate change can stimulate agreements in global climate negotiations that benefit all countries.

The United States 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 regulation through existing laws. U.S. 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. Leadership by the U.S. on climate change, especially measures that provide access to U.S. greenhouse gas markets and other performance-based incentives, can provide a strong motivation for China and other emerging economies to make greater commitments to combating climate change.

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

Both the United States and China are facing unprecedented economic challenges. And both have recognized the importance of using the present economic downturn to transition to sustainable economic development paths through significant investments in energy efficiency, renewable energy, and other green infrastructure. This provides a unique opportunity to create millions of valuable green jobs in each country, enabling the United States and China to lead the world in the development of new green industries and clean technologies. Promoting green jobs and industries will also strengthen the energy security of each country by reducing reliance on imported fossil fuels.

The economic stimulus packages of both countries include promising green components. China disclosed a \$585 billion (4 trillion yuan) stimulus package that proposes at least \$30.9 billion (210 billion yuan)⁷ for biological conservation and environmental protection. China's Ministry of Environmental Protection has announced that the stimulus will "not be spent in the energy- and resource-intensive industries or high-pollution industries" and will instead benefit renewable energy and pollution control industries. The U.S. Congress also passed an \$820 billion 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.⁸ 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 vowing 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 400 billion yuan proposed for housing projects is spent only on green buildings that save water and energy and are located using smart-growth principles. The 1.5 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 R&D and innovation projects should focus on clean energy, advanced transportation, and energy and water efficiency technologies. The stimulus package should 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 United States stimulus package. NRDC and others have proposed, for example, a more than \$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.⁹

The U.S. and Chinese economies are inextricably intertwined, so any hope of economic recovery requires joint action. There are enormous opportunities for the United States and China to cooperate in the development of strategies that will jump-start the global economy, create green jobs, and protect the climate. Some immediate steps to leverage both countries' economic stimulus packages could include cooperation in the development of:

- Performance-based criteria for directing economic stimulus investments toward 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 tasks;
- 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 in clean technology; and
- Joint programs to improve environmental monitoring and reporting, training of environmental regulators and enforcement officials, public supervision, and transparency.

More ambitious efforts could include the establishment of special economic zones (SEZs) in China and the United States aimed at fostering the growth of companies manufacturing energy-efficient products and developing green technologies. 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, such as 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 U.S. demand for green technologies, in turn spurred by the U.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.

Bilateral cooperation between China and the United States can spur changes in the global system and increase demand for green technologies in other countries. To maximize the potential for such cooperation, China and the United States should create:

- A high-level forum to share lessons and explore opportunities for cooperation in promoting green jobs and industries and investment in sustainable infrastructure. This forum should include input from state and provincial government officials, business leaders, scientists, engineers, labor representatives, and nongovernmental organizations (NGOs).
- City-to-city exchanges on experiences in low-carbon practices, including industrial and building energy efficiency; green transportation and sustainable city planning; and promotion of green jobs. The EcoPartnerships Program established as part of the Strategic Economic Dialogue between China and the United States has begun to implement this concept (pairing, for instance, Denver and Chongqing, the Port of Seattle and Dalian Port Corp., and Wichita, Kansas, and Wuxi City, Jiangsu Province). These efforts should be continued and expanded.
- Study groups of policy makers and technical experts to share the most cost-effective ideas for implementing greater energy efficiency in buildings, industry, power generation, transmission, and vehicles, as well as improving 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 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 the United States and China. A McKinsey Global Institute study, for example, found that a worldwide effort to boost efficiency using existing technologies with an internal rate of return of at least 10 percent could eliminate more than 20 percent of world energy demand by 2020.¹⁰ 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 (EPA) have facilitated a 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.¹¹ 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 United States 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 equivalent Chinese energy efficiency policies, to share experiences, and to develop policies and programs that will:

- *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 United States 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 expanded 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, which may be funded by a small ratepayer charge on each electric or gas bill, provide financial incentives 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.¹²
- *Work to increase opportunities for financing of energy efficiency.* Under the Ten Year Energy and Environmental Framework, the U.S. Trade and Development Agency and the U.S. and Chinese export-import banks have been working to increase financing opportunities for energy efficiency investments involving U.S. exports. The United States and China should also work to increase communication between private-sector banks in both countries that are supporting energy efficiency investments, and help strengthen the role of energy service companies (ESCOs) in financing and implementing energy efficiency investment.
- *Provide other regulatory and tax incentives.* The United States and China should 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 U.S. manufacturing while also reducing emissions related to manufactured goods produced in China for both domestic consumption and export to the United States.* 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 in 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 per 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 in building energy performance.¹³ In the United States, 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 nation.¹⁴ We recommend that the United States 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 and provinces that demonstrate the most rapid 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.* U.S. and Chinese manufacturers should voluntarily provide data to the U.S. Department of Energy (DOE) and the State Administration for Quality, Supervision, Inspection and Quarantine when requested by these agencies. Exchanging nonproprietary data in a transparent manner can help each country ensure that its efforts to push appliance efficiency are informed by state-of-the-art technologies. Part of this effort should involve comparisons of each country's testing methods and how they affect rated performance.

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

In addition to reducing the demand for energy, the United States 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 potential. The United States possesses state-of-the-art renewable energy technologies, including wind, solar, biomass, and enhanced 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 percent of all new solar hot water heater systems worldwide in 2005.¹⁵ China has also adopted ambitious renewable energy development goals, but meeting these goals requires more aggressive investment in research and development and in deployment.

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

- Increase regular exchanges on specific renewable energy development topics, including technical, policy, investment, and manufacturing aspects;
- Cooperate in 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 scaling up of renewable energy technologies. The United States, 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 in

new homes where appropriate. California already has a \$250 million rebate program for solar water heaters, and Hawaii will require all new single-family homes to install solar hot water heaters starting in 2010. Both countries should also share experience in implementing their renewable energy incentive programs. For example, China just announced that solar projects larger than 50kW of output will be eligible for a subsidy of about \$2.93 per watt.

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

China and the United States both have successes to share on measures to reduce GHG emissions in the transportation sector. Both countries have enacted or are planning to enact new tougher vehicle fuel economy standards. China has raised pump prices in Beijing to fund cleaner fuel, and recently launched the world's first production plug-in hybrid electric car. In the United States, 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.

We recommend that the United States 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-powered electric vehicles, and fuel cell technologies; (2) appropriate methodologies for determining life cycle 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 Port of Los Angeles model that NRDC helped to pioneer), and more efficient long-haul freight trucks.

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

Coal is a significant source of electricity generation in both countries, accounting for nearly 80 percent of the electricity produced in China¹⁶ and nearly 50 percent in the United States.¹⁷ Coal-based electricity generation accounts for a large share of both countries' CO₂ emissions, yet coal is forecast to be a part of the energy mix in the United States and China in the near term. Efforts are ongoing in both countries to support carbon capture and storage (CCS) research and development, but in light of the climate challenge we all face, they are inadequate in both scale and speed.

If the goal in the United States is to reduce current carbon emissions by 80 percent by 2050, we will need CCS of 1.1 billion tons of CO₂ per year just to meet 10 percent of that reduction target.¹⁸ As for China, whose carbon emissions are predicted to more than double by 2050 under a business-as-usual scenario, holding emissions at a level 40 percent above the current rate would require a similar amount of CCS. Currently, there are only 4 major pilot projects in the world, each with a capacity greater than 1 million tons of CO₂ injection per year. A dozen or so new initiatives have been announced in recent years in some industrialized countries. Accelerated R&D and field demonstrations on CCS 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 reductions. We therefore recommend that the United States and China:

- Cooperate to share capital costs and expertise in establishing five large-scale “low-hanging fruit” demonstration projects in China, strategically chosen in different basins that need to be characterized for their CO₂ storage potential.
- Set up a joint CCS Advisory Group or program to lead studies and development of CCS technical and legal standards for China, learning from ongoing efforts in the United States;
- Launch capacity-building efforts in China on site selection, evaluation, and monitoring;

- Work together to develop road maps on CCS deployment;
- Initiate a joint public forum to promote, communicate, and educate on CCS; and
- Establish a U.S.–China Fund on CCS aimed at developing and financing large-scale demonstration projects in China for enhanced oil recovery and storage in deep saline aquifers.

7. Improve greenhouse gas emissions monitoring and data transparency.

Both the United States 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 progress in reducing GHG emissions. However, China does not regularly release GHG emissions data, and there are perceived weaknesses in the quality and transparency of this 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 and are subject to international review. Different 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 issues identified in these recommendations. In order to improve the quality of available data and enhance mutual trust, we therefore recommend that the United States share its experience on collecting, monitoring, and reporting GHG emissions data. We also recommend that the United States 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 United States 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, a sufficient budget, public participation, and measures to promote compliance (such as training and financial incentives). 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 United States in the 1970s). The United States 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 this country. We recommend the establishment of regular exchanges and sharing

of expertise 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 standards so that consumers have reliable information about the energy efficiency and environmental impact of the products and services they purchase. The United States 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 engage with businesses to incorporate information on energy efficiency into market transactions, such as making a building's energy ratings part of the permanent record of the building. Serious commitment to rule of law and enforcement of laws, including intellectual property laws, will help pave the way for greater exchange of technology as well.

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

Conclusion:

The United States and China Must Act Now

The United States 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 policies 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.

The nine overarching actions and the many underlying specific steps outlined here will not by themselves solve 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 United States and China do not have to start from scratch in these efforts. Many of them are already being undertaken with varying levels of success and support. However, to be effective, the United States and China will need a stronger political commitment from the heads of government, scaled-up resources, and focused efforts to ensure that the necessary actions are delivered on the ground in each country. It can and must be done. And it needs to begin immediately.

Appendix:

NRDC's Work in China

For nearly 15 years, NRDC has been working in China with local partners to address some of the world's greatest environmental challenges, striving to create innovative solutions for a cleaner, healthier environment and to curb global warming. Our work in China builds on our long-standing 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 we are proud that NRDC has been active 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, nongovernmental organizations, and legal community to help promote cutting-edge energy and environmental solutions for the country. 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 past 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 coming 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 completed a nationwide DSM Implementation Manual under the sponsorship of the National Development and Reform Commission, which was used as the basis for a nationwide training program that began 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 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 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 coal gasification capacity-building and to increase the Chinese government's attention to carbon capture and storage (CCS). We have supported Chinese experts who are studying the technical, institutional and regulatory barriers to polygeneration development, lobbied the government to increase attention to coal gasification-based coproduction, and helped the Chinese government draw up a road map for the demonstration and commercialization of coal gasification, IGCC, and coproduction technologies.

Our efforts and those 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 coproduction as key areas for research, development, and demonstration. The road map on coal gasification that Chinese experts developed with our support provides timely and major inputs for China's 11th Five-Year Plan on Science and Technology Development. In accordance with the plan, China is building the country's first group of industrial-scale IGCC/coproduction demonstration facilities. These planned industrial demonstrations will be an essential stage for achieving cost reduction, technology maturity, and eventual widespread application of IGCC. China's Ministry of Science and Technology also has begun to support research projects on CCS, an area that China had not wanted to focus on due to political considerations. This is 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/coproduction 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 successfully encouraged the formation of an innovative public-private partnership for clean vehicle commercialization. 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 gives energy conservation and efficiency the highest priority and includes 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; the 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 training 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, arms citizens with how-to guides to getting involved, and provides localized information about different regions' environmental initiatives.

Promoting Responsible Sourcing

NRDC and a partner, the Council of Fashion Designers of America, are spearheading a multiphase initiative called Clean by Design. This program aims to revolutionize the way the textile industry operates by connecting design choices to manufacturing consequences 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 measures that would increase efficiency and shrink the factory's carbon footprint. We are conducting additional factory audits before compiling best practices for pollution prevention and efficiency opportunities for the industry. Phase three, slated for spring 2010, 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, and 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.

Endnotes

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- 2 Based on 2005 data compiled by the World Resources Institute in its Climate Analysis Indicators Tool, <http://cait.wri.org>.
- 3 An HSBC Global Research report released January 19, 2009 estimated that 16 percent of the U.S. stimulus would go to “green investments” and that China planned to invest 34 percent of its stimulus in green businesses.
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- 6 For example, a forthcoming NRDC discussion paper evaluates some designs for this approach that could be crucial in ensuring that it is effective and credible.
- 7 The amount allocated for biological conservation and environmental protection projects was revised in March 2009 to 210 billion yuan.
- 8 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.
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- 11 U.S. Department of Energy, U.S. Environmental Protection Agency, *National Action Plan for Energy Efficiency*, <http://www.epa.gov/cleanenergy/energy-programs/napee/index.html>.
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- 16 China Electricity Council data for 2008, available at: <http://www.cec.org.cn/html/news/2009/1/5/2009151635506199.html>.
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- 18 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>.



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