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Breaking the Suicide Pact: U.S.–China Cooperation on Climate Change

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SUMMARY

- U.S.–China climate cooperation is *the* critical step toward a global climate agreement. Yet the two countries are locked in a "suicide pact"; each refuses to act before the other.
- The time to act is now: for the first time, China is considering an emissions target while half of U.S. states have set their own targets.
- The U.S. and Chinese energy sectors have distinct structures, but both would benefit from improvements in energy efficiency.
- Yet both countries could reach a deal—without a treaty—that could unlock the global stalemate.
- Such a U.S.–China deal would result in the adoption of existing energy technologies to increase efficiency; joint innovation of new technologies; and an agreement to prevent the two countries from not taking advantage of steps taken by either.

Together, China and the United States produce 40 percent of global greenhouse gas emissions. Their actions to curb or expand energy consumption will determine whether efforts to stop global climate change succeed or fail. If these two nations act to curb emissions, the rest of the world can more easily coalesce on a global plan. If either fails to act, the mitigation strategies adopted by the rest of the world will fall far short of averting disaster for large parts of the earth.

These two nations are now joined in what energy analyst Joe Romm has aptly called "a mutual suicide pact." American leaders point to emissions growth in China and demand that Chinese leaders take responsibility for climate change. Chinese leaders counter that American per capita greenhouse gas emissions are five times theirs and say, "You created this problem, you do something about it."

Concern for energy security deepens this dilemma. U.S. congressional staff experts think energy is twice as likely to cause conflict between the two countries as human rights. Mainstream Americans fear that China is gobbling up oil and driving up the price of gasoline. The Chinese fear American control of Middle East oil and of shipping lanes to China.

However, current events are opening a window for change. The United States is moving to address climate change, if only at the state level. Almost half the fifty states have made sig-

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nificant commitments to cut carbon emissions. Crucially, Chinese leaders recently suggested that they might be willing to make a climate commitment. Analysts at the Energy Research Institute, a leading Chinese government think tank, suggest that China could cut its current emissions growth rate by half through 2020, and from that level reduce absolute emissions by one-third by 2050. This scenario would put within reach a global goal of stabilizing the atmospheric concentration of carbon dioxide below 500 parts per million. Such a commitment would represent a profound shift in China's position, and it could be pivotal in reducing the worst risks of climate change.

Thus, a path can be glimpsed to breaking the suicide pact and achieving a bilateral breakthrough, if Chinese and American leaders and policy makers can find a deeper understanding of energy realities; grasp the need for immediate action to reduce carbon emissions; and develop a new, non-treaty-based approach to reaching an international agreement—and eventually even a post-Kyoto global climate accord.

A Billion Americans

What if the Chinese used energy like Americans? Global energy use would double, and five more Saudi Arabias would be needed just to meet oil demand. China itself would produce six times as much coal as it does today.

Many observers fear that this is exactly what will happen. China has tied the United States for the dubious distinction of being the largest national source of greenhouse gas emissions, producing more than 18 billion tons of carbon dioxide per year. China's population is more than four times that of the United States, though it is growing more slowly (see figure 1). After decades of aggressive and unprecedented energy and population policies that dramatically reduced emissions growth, Chinese energy demand has this decade surged one-third faster than the economy.

No one can deny that the United States has created far more climate pollution than China. Since the beginning of the Industrial Revolution, the United States has produced 1,150 billion tons of carbon from fossil fuels, compared to China's 310 billion tons. The average Chinese produces just one-fifth as much carbon dioxide as the average American. Still, there is no argument even from Chinese leaders that China's rapid economic expansion poses a major threat to the global environment commensurate with America's continued high consumption rates. China maintains that climate action should be taken on the basis of "differentiated responsibility." This concept means that the nations that grew rich burning lots of fossil fuel should take stronger action, while rapidly developing nations also share the responsibility to act.

Supply and Demand

Reaching this type of mutual accommodation needs to start with an understanding of the two countries' baseline energy consumption. China today uses 65 exajoules of energy compared with 100 exajoules for the United States. Energy demand in each country is forecast to grow to 120–150 exajoules by the middle of this century. Both reducing demand and changing the mix of energy supply sources will be crucial to climate protection.

The structure of energy demand in the two economies could not be more different (figure 2). Industry takes over two-thirds of China's energy supply and only one-third of America's. The Chinese burn about 10 percent of their energy as fuel for transport, while Americans consume almost 30 percent for transport. The Chinese use 20 percent of energy in their buildings, compared with almost 40 percent for Americans. China in many respects remains a developing country with a per capita gross domestic product and energy use several times lower than those of the United States.

Energy intensity—the amount of energy used per unit of economic output—declined dramatically in China from 1980 through 2000 but has increased just as dramatically during the past decade. An explosion in the production of energy-intensive materials such

as steel, cement, and chemicals has helped fuel China's phenomenal economic growth. China now produces 35 percent of the world's pig iron and 45 percent of its cement—most of which is used domestically. The United States now imports from China about 20 percent more embodied energy—the energy consumed in product manufacturing—than it exports to China.

An American is twenty times more likely to have a car than a Chinese, and the United States has weaker fuel economy standards than China. Automobile ownership in China remains low, with only forty cars per 1,000 people, but it is growing very rapidly. China has about 35 million cars on the road, whereas the United States has roughly 185 million. Automobile sales in China in 2006 were up more than 25 percent over the previous year, to more than 7 million vehicles.

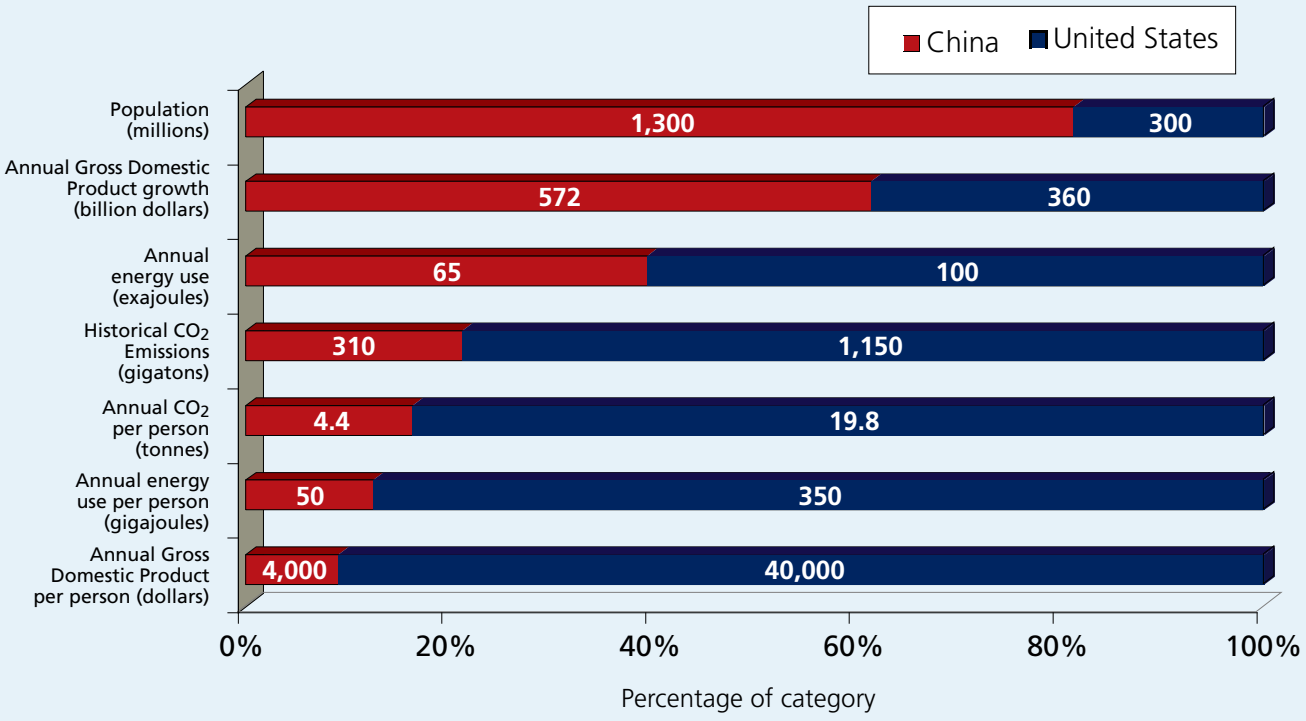
Households in America use vastly more energy than households in China. American homes average two and a half times the size of Chinese homes, a disparity not expected to disappear for twenty to thirty years, if ever. Chinese appliances remain small and efficient compared with those used by Americans.

China suffers what the poet Pablo Neruda called "the curse of coal." If China consumed the same total amount of energy as it does today but used the same energy mix as the United States, its carbon emissions would be 20 percent lower. Coal provides only a quarter of American primary energy supply but almost three-quarters of China's (figure 3). Casual observers assume that China has no choice but to use its billions of tons of coal reserves. They overlook the fact that U.S. coal reserves are more than twice as large as China's, and the United States uses coal to a far lesser degree.

A non-treaty based approach can break the suicide pact.

For more than a decade, China has been the world's second-largest electricity consumer, but its per capita consumption even today stands at only half the world average and one-eighth

FIGURE 1 Selected Comparisons of the United States and China, 2006



the level of the United States. More than 75 percent of China's electricity is generated from fossil fuel combustion, with hydroelectricity supplying much of the balance.

China has twenty nuclear power plants—about 20,000 megawatts—which contribute only 2 percent to total power. The amount is expected to double by 2020 but would still be a small share. Low-carbon natural gas provides a quarter of American energy but just 3 percent of Chinese energy. China ranks fifth in world wind power construction, but it yearly adds forty times more coal-fired capacity than wind.

FIGURES 2-3

FIG2 ■ U.S. and Chinese Energy Consumption by Sector, 2006 (percent)

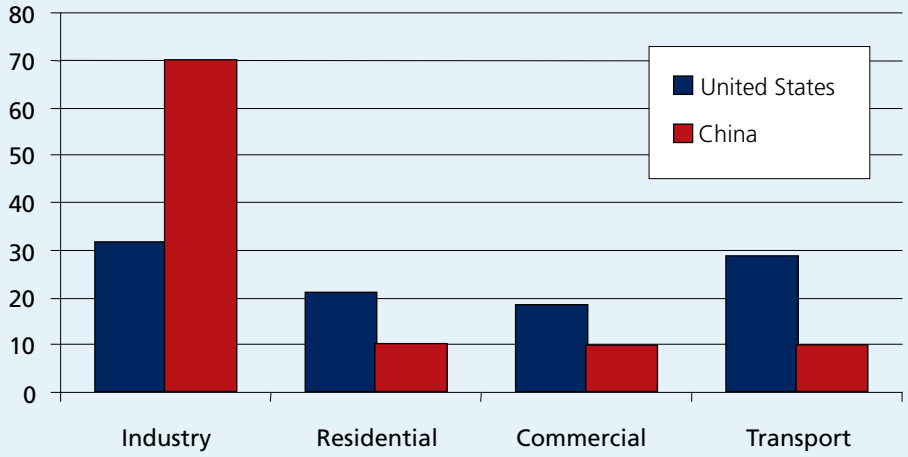
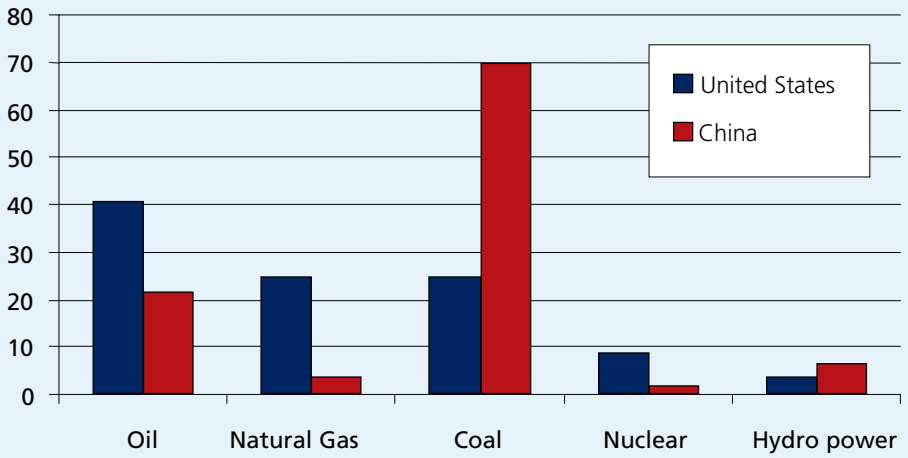


FIG3 ■ U.S. and Chinese Primary Energy Supply, 2006 (percent)



Where to Cut

The technical literature has repeatedly shown that with existing technology, the United States and China could both cut deeply into their carbon dioxide emissions. A 2007 United Nations Foundation study, *Realizing the Potential of Energy Efficiency*, concluded that the United States and the other countries belonging to the Organization for Economic Cooperation and Development could realistically set deep emissions reduction goals with little economic dislocation.

The U.S. industrial sector, for example, could use cogeneration, electric arc furnaces, continuous casting, motor speed controls, more efficient boilers and evaporators, and even simple devices like steam traps to cut industrial energy use by 40 percent by 2025 and still continue its growth in output. And a recent study by Tsinghua University's Wang Yanjia finds that the metallurgy, cement, and chemicals industries in China use 10 to 30 percent more energy per ton of output than their counterparts in Japan, Europe, and the United States, leaving ample room for cost-effective energy-efficiency improvements.

The automobile industry in both countries produces absurdly powerful engines, grossly inefficient drive trains, and obtuse aerodynamic designs. Doubling the efficiency of both the U.S. and Chinese automobile fleets would not be difficult technically or economically.

Commercial building technologies in China and the United States are similar, with the exception of window systems, which are far more efficient in the United States. The key economic challenges are to reduce heat loads from inefficient light bulbs, improve the efficiency of heating and air conditioning systems, and improve the thermal efficiency of building envelopes.

New energy supply options are also quite similar. Importing low-carbon natural gas is a relatively simple approach that over the next two or three decades could help both nations meet their emission reduction goals. Gas contains only half the carbon content of coal, and

it remains affordable. Nuclear power costs about the same as hydroelectric power in both countries but is twice as expensive as coal-fired power. Beyond economics, the key question for nuclear advocates is how nations can secure the plutonium—fuel for nuclear weapons—unavoidably produced by commercial power reactors. For coal advocates, carbon capture and sequestration seems to provide a technical solution that nations can explore for the long term. But budget pressures recently led to the cancellation of U.S. government support for PowerGen, the largest demonstration project of this technology.

The overwhelming conclusion from numerous technical and sectoral analyses is that the potential for energy-efficiency intervention in the U.S. and Chinese economies is very large and growing. The research literature, anecdotal evidence, case studies, and direct experience all suggest that this potential could be captured profitably—but probably will not be without intervention. Saving energy is simply no one's priority, even when it saves them money. Fiscal and financial incentives can help elevate energy saving in industry, but regulatory policy seems to work better for households.

The challenge for policy makers is to develop strategies that help the market converge on the most cost-competitive technologies. This means that U.S.–China cooperation should focus on encouraging feasible market-based technologies and on removing barriers to their widespread deployment.

Perverse Policies

Pricing profoundly affects energy choices. Underpriced energy is the world's largest subsidy for environmental destruction.

The Chinese government continues to intervene heavily in energy pricing, recently even freezing—in a profoundly wrongheaded move—key energy prices. But that does not imply low prices for Chinese consumers. The price of natural gas sometimes exceeds American levels. Coal prices in both countries climbed to about $50 per metric ton in 2007. The United States provides a few billion dollars in tax subsidies each year to oil and gas producers. This is an important subsidy for accelerating global warming. The Chinese provide even greater subsidies by sponsoring massive, inefficient state-owned firms and guaranteeing their finances.

Underpricing energy represents the world's number one subsidy for environmental destruction.

The U.S. federal government heavily intervenes in the power market, requiring utilities to guarantee power supply almost no matter how high the cost and then providing pricing regulations that essentially ensure that the utilities—including federally owned ones—make a profit. Whenever the consumer throws the switch, whether for a small lamp or an energy-hogging plasma TV screen, the power must be there. It is a basic tenet of economics that consumers should be charged the marginal cost of electric power—the cost of adding the last, most-expensive unit consumed. But regulators set consumer prices on the basis of the average cost of power, effectively providing the largest subsidy of all for power consumption and its attendant pollution.

Since the early 1980s, China has implemented an extensive system of appliance labels and standards. Mandatory standards exist for nine major household appliances and a voluntary labeling program covers thirteen products, including air conditioners, refrigerators, and televisions. Chinese policy regarding appliance efficiency standards was consolidated and accelerated by the passage in 1997 of the National Energy Conservation Law. However, most experts admit that this law is more of a framework—a shell—than an effective mechanism for enforcing regulations.

In contrast, U.S. efficiency standards for energy-gobbling appliances are almost unique in the world and certainly rank among the most successful American energy policies. American refrigerators built in the mid-1980s

consumed 1,500 kilowatt-hours a year. Today, the same-size models providing similar features use only about 600 kilowatt-hours a year. Air conditioners, water heaters, furnaces, and other appliances are similarly regulated. Efficiency legislation passed in 2007 effectively bans the incandescent light bulb.

Significantly, China has recently adopted a law to regulate automobile fuel economy in a manner similar to the U.S. corporate average fuel economy standards. If fully implemented, it will actually ban many fuel-inefficient sport utility vehicles or require them to improve fuel economy above U.S. passenger car levels. The law should increase the fleet fuel economy of Chinese cars to 6.7 liters per 100 kilometers (35 miles per gallon) by 2015. The United States recently enacted similar legislation that does not achieve that level until 2020. The U.S. law also contains an "alternative fuels" loophole that will undermine enforcement.

In China, the legal and regulatory barriers to clean energy investment are significant. Controls on foreign investment create high transaction costs. Banks are effectively forbidden from lending to the energy-intensive sectors, inadvertently blocking a vital pathway for investment in energy efficiency where it could make the most difference. Tax policy discourages domestic energy services with a high value-added tax. A lack of transparency in regulatory policy increases uncertainty, risk, transaction costs, and corruption. For example, the deadline for a foreign equity transfer, the permissible scope of a business license, or the determination of ownership of emissions credits can be decided by local officials on the basis of "internal regulations"—unpublished rules that vary by province and by individual.

China's strong, centralized policy on clean and renewable energy has not been translated into tangible incentives at the provincial level. The Cleaner Production Promotion Law, for example, avers that "enterprises shall recover and utilize their own wastes or wasted heat," but the law offers no realistic incentives, regulatory relief, or financial support for doing so. In practice, it is largely ignored.

A Path to Cooperation

The United States and China seemingly remain locked in their suicide pact, each arguing that the other is the reason it cannot stop its self-destructive energy-using behavior. Negotiations for a global post-Kyoto climate agreement are not likely to break this impasse. On the contrary, reaching a global climate change agreement will first require accommodation between the United States and China.

There is a way forward. Chinese climate leaders, at the Bali climate conference and elsewhere, have suggested that China could set a target to cut emissions growth to half the rate of growth in gross domestic product through 2020, and then cut emissions from that level by 30 percent by the middle of this century. Significantly, China is already aggressively pursuing a goal to reduce the energy intensity of its economy by 20 percent by 2010. Many inefficient and outmoded state-owned cement plants and other heavy industrial facilities are being shut down to shift production to newer, more efficient plants.

At the same time, U.S. states including California have set strenuous targets for emission reductions—50 to 80 percent or more by 2050. Some states have imposed stringent fuel economy standards on cars and portfolio standards on utilities. The states' emission goals are voluntary in the sense that no outside power can enforce them. But the standards and the measures they impose to achieve them are enforceable. This same model could be applied internationally. China and the United States could cooperate to set individual, national goals and then work together to achieve them through domestically enforceable measures and international agreements that prevent either nation from taking advantage of steps taken by the other.

Cooperation could be organized in three priority areas: deployment of best practice technologies, innovation in new technologies,

and agreements to prevent the two countries from taking advantage.

Deployment means promoting the market penetration of existing carbon emission reduction technologies. Business leaders could help by working with both governments to solve problems impeding the market application of existing technologies. Joint policy initiatives to provide tax breaks for investment and impose tax penalties on high-carbon energy would reduce the risk that either country would take advantage of goals and measures set by the other. Beijing could make it easier for foreign companies to invest directly in clean energy projects by removing constraints on converting foreign exchange for investing and repatriating profits. Another priority is to exempt energy-efficiency services from China's 17 percent value-added tax. The government could encourage banks to do risk-based clean energy lending, which means removing the regulatory cap on interest rates for energy-efficiency investments. No investor or lender wants to earn interest at rates just barely above inflation, as banks in China are limited to doing.

The leaders among U.S. states in energy innovation, especially California, could provide assistance to Chinese provincial leaders struggling to deal with energy problems. The Chinese central government has set sound high-level policies for efficiency and clean energy development, but it leaves implementation to unprepared, underresourced provincial leaders. Beijing could support these provincial leaders by providing funds, training, expertise, and tax and regulatory flexibility to enable them to take decisive action to encourage clean energy investment. And the U.S. states could share their experience, providing advice on which policies actually work.

Efforts to develop new technologies—carbon capture and storage systems, very efficient industrial production processes, a smart electric grid system to integrate distributed energy production and demand-side management—all would take massive investments, the best scientists and engineers, and many years. To pursue this process, it would be in the interest of American laboratories to link more closely to Chinese markets. Innovation stems from feedback from the marketplace, making joint research and development in China, where the market is most dynamic, necessary for U.S. firms to remain competitive. Unfortunately for American science, there is little congressional support for this approach. Fortunately, however, China today is in a position to share research and development costs with the United States.

Strikingly, given the urgency of climate action, resources are meager within both China and the United States for energy efficiency and power sector decarbonization. Technology deployment gets little support within either nation. Official funding for clean energy cooperation between the countries amounts to only about $1 million a year. The private U.S. Energy Foundation provides twenty times more, but even this level of funding is far below the need.

Making climate cooperation integral to trade policy should be a priority. For example, both countries could agree that after 2015 they would export only appliances, cars, and equipment with efficiency levels higher than the world average today. And they could jointly set production standards to limit the energy used in manufacturing exports.

If this U.S.–China policy experiment works, it could be replicated in other countries, notably India. China and the United States could develop packages of policies and measures, test them for efficacy, correct them, and share them.

U.S.–China collaboration should not be envisaged as a threat to the climate leadership of any region or nation or to global cooperation. It should not challenge existing or planned emissions cap and trade systems. Rather, it would be, and should be, considered an act of mutual self-preservation, helping both the United States and China to avert climate disaster and the eventual sanctions of other nations if they do not act, and laying the basis for successful global action. ■

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RESOURCES

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Financing Energy Efficiency in China, William Chandler and Holly Gwin (Carnegie Endowment for International Peace, 2007) www.carnegieendowment.org/files/chandler_clean_energy_final.pdf.

World Energy Outlook 2007: China and India Insights, International Energy Agency (Paris, OECD/IEA, 2007).

Climate Change Mitigation in Developing Countries: Brazil, China, India, Mexico, South Africa, and Turkey, William Chandler, Roberto Schaeffer, Zhou Dadi, P. R. Shukla, Fernando Tudela, Ogunlade Davidson, Sema Alpan-Atamer (Pew Center on Global Climate Change, 2002).

The Role of CO_2 Embodiment in U.S.-China Trade, Shui Bin and Robert Harris (*Energy Policy*, Vol. 34, Issue 18, 2006).

Achieving China's Target for Energy Intensity Reduction in 2010, An Exploration of Recent Trends and Possible Future Scenarios, Lin Jiang, Zhou Nan, Mark D. Levine, and David Fridley (Lawrence Berkeley National Laboratory, 2006) http://china.lbl.gov/publications/lbnl-61800.pdf.

Realizing the Potential of Energy Efficiency (United Nations Foundation, 2007).

Energy Efficiency Policy and CO_2 in China's Industry: Tapping the Potential, Wang Yanjia, Tsinghua University, Presented at the OECD Global Forum on Sustainable Development, Paris, IEA, March 20, 2006.

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