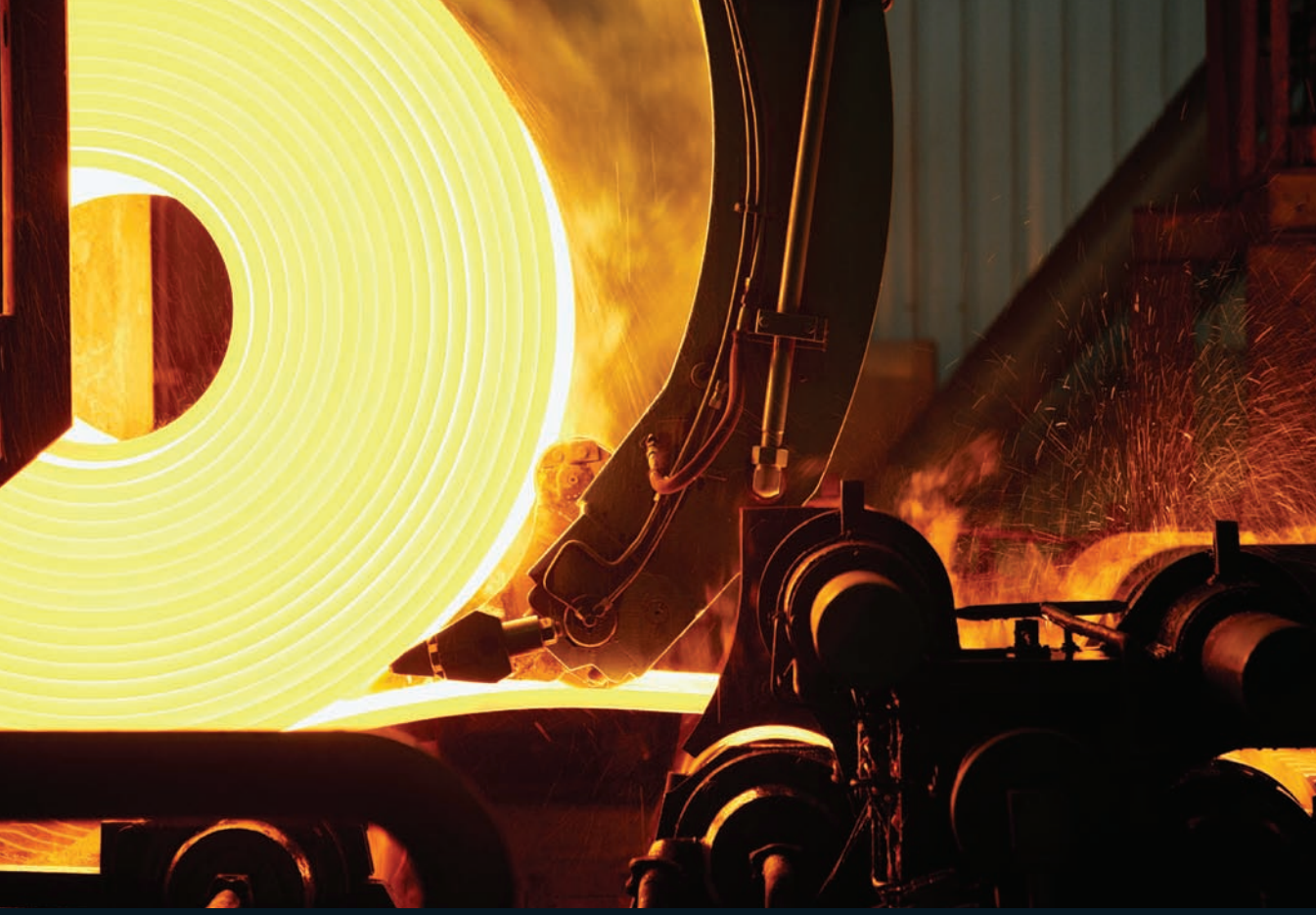

FINANCING ENERGY EFFICIENCY IN CHINA

William Chandler • Holly Gwin

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Acknowledgments

In 2005, we established a U.S.-based corporation for the purpose of developing clean energy projects in China, Transition Energy. This experience both prompted and shaped this paper. This report is not about the financial success of this venture—it is far too early in the life of the firm to speculate on that. Instead, we address the policies and practices that slowed the process of securing clean energy in China and increased the cost of obtaining finance for it.

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Removing barriers to clean energy investment in China may contribute more to climate protection than any global climate treaty. The incentives and rules of such a treaty will be blunted and frustrated by distortions of the world's largest potential clean energy marketplace unless policy makers recognize and deal with the realities of that market.

This paper describes problem areas and suggests policy adjustments for domestic and international cooperation to reduce the growth of greenhouse gas emissions in China.

China fortunately has made energy efficiency and sustainable energy development top policy priorities. Only Europe has set automobile fuel economy targets higher than China. No nation has a more exacting goal than China's plan to cut energy intensity by 20 percent by 2010.

But unintended consequences of regulatory policies—red tape—obstruct clean energy development in China. Lending controls, foreign investment laws, company formation regulations, and even the Clean Development Mechanism (CDM), a kind of emissions trading system between rich and poor countries created by the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), increase financial risks and costs for project developers through unnecessary expenses and lengthy wrangles for approvals. These poorly understood barriers to clean energy investment frustrate China's admirable commitment to ambitious clean energy goals.

Although customers for clean energy are motivated by high energy prices and energy shortages, the Chinese marketplace lacks certain basic mechanisms to implement clean energy measures. A gap separates objectives set by the national government and implementation of them by provincial and local government leaders.

Clean Energy Finance in China

The problems with energy efficiency finance in China are not the usual complaints: an overabundance of cheap coal or a reckless disregard for the environment. Coal is, after all, an expensive and difficult-to-deliver energy source in China. And clean energy is a stated priority at the highest levels of the Chinese government. Chinese leaders have even begun discussing a goal for cutting greenhouse gas emissions by 2050, albeit from 2025 levels, which are expected to be higher than they are now.[1]

China has enacted impressive, well-intentioned national policies to promote clean and renewable energy that reflect a seriousness of intent lacking in many countries, including the United States. The Cleaner Production Promotion Law (2002) directs enterprises to "recover and utilize their own wastes or wasted heat." It also requires that ". . . environmental impact assessments . . . shall accord priority to adopting cleaner production technologies . . . . " The Renewable Energy Law (2005) supports the use of financial incentives. Article 25 of the law authorizes financial institutions to offer preferential loans with subsidized interest rates to projects involving renewable energy development and utilization.

Chinese leaders frequently reassert their support for these pathbreaking policies. President Hu Jintao has been quite visible and articulate in expressing strong support for clean energy goals, stating recently, for example, that "China attaches great importance to energy conservation. We . . . give top priority to conservation."[2] This strong political support has helped to create a modest market for clean energy. But the size of this market will continue to be limited due to impediments to financing of efficiency and other forms of clean energy.

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1. Jiang Kejun, division director, Center for Energy, Environment and Climate Change Research, Energy Research Institute, National Reform and Development Commission, Beijing, private communication, September 2007.

2. Hu Jintao, president of China, in a speech before the APEC CEO Summit, Busan, South Korea, November 17, 2005. Source: Chinese Ministry of Foreign Affairs, www.mfa.gov.cn/eng/wjdt/zyjh/t222773.htm.

There are at least four major barriers to clean energy finance in China that the government has not addressed:

- ❒ Restrictions on debt financing
- ❒ Restrictions on foreign equity investments
- ❒ Asymmetric policies at the central and local levels
- ❒ Confiscatory tax policy

This report describes these barriers, as well as investment risks and regulatory delays inadvertently created by Kyoto's Clean Development Mechanism, and suggests policy changes that could accelerate the development of clean energy in China.

Restrictions on Debt Financing

It seems absurd that China would have difficulty financing clean energy investments on its own. Yet, China's capital markets—both equity and commercial paper—rank among the smallest financial markets in the world. Debt finance in China lacks flexibility. Corporate bonds provide $5 trillion per year in financing in the United States,[3] but this type of financing barely exists in China.[4]

Chinese equity markets provide only about 25 percent of the capital provided by comparable markets in other developing economies, and commercial debt provides only 2 percent. Moreover, China uses its investment capital far less efficiently than South Korea or Japan did at comparable stages of development. China's financial system channels only about one-quarter of new

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3. Standard and Poor's, "Preferred Stock Primer: A Short Guide to Preferred Stocks and the S&P U.S. Preferred Stock Index," Preferred Stock White Paper, March 6, 2007, www2.standardandpoors.com/spf/pdf/index/PreferredStock_whitepaper.pdf.

4. Except in informal—and therefore illegal—private financial arrangements. The size of this informal market is unknown, but it is probably large and expensive.

investment into private companies. This number is striking because private firms account for more than half of gross domestic product (GDP), and the state-owned enterprises that gain use of much of the nation's credit produce only about a quarter of GDP. This situation has led to the declining productivity of capital. More importantly for the subject at hand, clean energy investing would most effectively be developed by the private sector. The financial system thus is inherently biased against clean energy investing.

All interest payments are assessed a 10 percent withholding tax—another disincentive for debt finance. The tax basically requires any company that borrows money for implementing an energy efficiency project or renewable energy project to pay the central government an amount equal to 10 percent of the interest payments it makes on the loan. While frustrating, barriers such as this pale in comparison with indiscriminate constraints on lending to energy-intensive industrial sectors and the absence of risk-based lending.

The big regulated utilities—which are building on average two large, coal-fired power plants per week—do not suffer the same constraints as clean energy developers. The utilities have invested at least $50 billion per year for the past several years. Annual investment in coal-fired electric power in China outstrips clean energy investment by a ratio of perhaps 10 to 1.[5] This disappointing comparison stems only in part from the kinds of barriers to new energy development seen all over the world—lack of familiarity with the clean energy business on the part of lenders and lack of experience in dealing with investors on the part of

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5. Data to compare energy efficiency, clean energy supply, and coal-fired power investments are not available to the authors. Data on efficiency investments, in particular, are not easily recorded and categorized. Nevertheless, anecdotal evidence as well as the experience of experts at the World Bank, the International Finance Corporation, and the Energy Foundation strongly suggest this disproportionate level of investing. Sources: Private communications with Calvin Xu, International Finance Corporation, Beijing, June and July 2007, and Yang Fuqiang, Energy Foundation, Beijing, July 2007.

developers. China has its own special set of barriers: investment controls, incorporation rules, usury laws, and lending rules, as well as unclear and changing CDM regulations. These problems, in combination with a lack of coordination of overarching central government policy with the regulations required of and implemented by provincial and municipal authorities, discourage—frighten is not too strong a word—foreign investors. The upshot is that despite China's $1.4 trillion in foreign currency reserves and the $3.6 trillion in Chinese currency deposited in Chinese banks, financing for clean energy is difficult to arrange.

A key problem is an inadvertent ban on loans for efficiency in the energy-intensive sectors. In its effort to rein in unbridled expansion of heavy industry, the Chinese government has barred lending to steel and cement companies. This crude industrial policy is a substitute for monetary policy, but it effectively blocks a vital pathway for clean energy finance. Cautious bankers fear running afoul of the heavy-handed regulations, and efficiency projects are looked on with great suspicion as a work-around to investment controls. This type of control creates high transaction costs for energy productivity investments.

But the new, modern, and efficient factories are exactly where one would want to be making energy-intensive materials. Greater efficiency in industrial energy use would result from shutting down old plants, which are often owned and operated by local governments and are inefficient due to poor management and outmoded technology. These companies lack what economists call "hard budget constraints," the requirement that they shut down rather than lose money. But because the operations are state-owned, there is a high political barrier to closing them.

Worse, a cap on interest rates unintentionally discourages "risk-based" lending to industrial energy efficiency projects. Returns on energy efficiency investments in China often exceed 50 percent per year (simple payback periods of less than two years are common for many measures), but a bank is generally not permitted to lend money at an interest rate of, say, more than roughly 8 percent. The cap on interest rates heightens the tendency of domestic Chinese banks to be risk-averse. This inability to capture a "risk premium"

is particularly troublesome in fields such as energy efficiency that often share risk characteristics, including:

- ❒ Customers lacking credit history
- ❒ Banks having no experience with energy-efficiency measures
- ❒ Companies providing energy services are often start-ups without financial security

Shareholder loans cannot pick up the slack because a foreign investor would look at the risk-return ratio of a loan to a start-up energy service company in China as it would a "junk bond." Investors in junk bonds expect a yield of no less than 4 to 10 percent over the yield on secure U.S. government bonds, and they often receive returns exceeding 20 percent per year. Adding a risk premium for investing in a country with as much uncertainty as China in its economy and legal system would simply increase the required yield to stimulate a loan or investment. Yet, China limits interest rates to less than 10 percent on foreign shareholder loans to a Chinese joint venture partner. That kind of yield is generally inadequate to justify the risk.

The International Finance Corporation (IFC) stands out because the IFC "gets it" when it comes to shaping financial solutions to energy efficiency investment in China. The IFC attacks two key aspects of the problem—the need for technical assistance in financial engineering and the need for loan guarantees for risk-averse financial institutions, particularly private Chinese banks (see box 1 for more detail). The IFC was so successful in designing and implementing its program that within six months of gaining Chinese government approval to provide guarantees with foreign currency, the IFC developed an energy efficiency pipeline of projects worth a total of over $650 million.[6]

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6. Sources: Private communications with Russell Sturm, IFC Washington (February 2004–July 2007); Jeffrey Liebert, IFC Beijing (April 2004–June 2007); and Calvin Xu (April 2006–August 2007). Calvin Xu is the program director for the Beijing-based IFC energy efficiency loan guarantee program.

Box 1: Defining Solutions—The IFC's Loan Guarantee Program

In 2006 the IFC launched a program to guarantee private Chinese bank loans for energy efficiency projects. The IFC takes a "first loss" position in loans for energy efficiency projects, guaranteeing private banks that they will not lose more than 25 percent of their loans for the first few projects they undertake with an energy service company or an industrial group. This familiarizes bankers with what is otherwise an unfamiliar business and business practice—efficiency investments that pay for themselves with a cost savings. The IFC program quickly was oversubscribed as it developed a pipeline of projects worth nearly $650 million. The IFC recently replenished and expanded the program with a commitment of new funds.

With reforms in its own financial markets, China can be expected ultimately to self-finance its vast energy efficiency requirements. The IFC's program to train financial institutions in the principles and methods of risk-based lending sets the stage for long-term success.

Restrictions on Foreign Equity Investments

Structuring a foreign equity investment in China remains a difficult task. In part, this is due to difficulty in leveraging equity with debt, for the reasons explained above. But other fundamental constraints apply to how foreign investors can bring money to China, including funds for clean energy investment, and the conditions under which profits can be repatriated. These problems remain big headaches for clean energy investors.

This fact strikes the uninitiated as not credible. After all, hundreds of billions of dollars, euros, and yen have streamed into Chinese investment in manufacturing. The attraction of China's low-cost, disciplined labor is a magnet for investment and is stronger than

the rules designed strictly to control foreign investment when China was poor and needed foreign currency. China's foreign investment rules lag far behind the reality that China now holds more foreign exchange than it knows what to do with. The benefit of using foreign exchange to promote clean energy investment would benefit China more than foreigners, yet the constraints on foreign investment are severe enough to slow foreign investment in clean energy to a trickle.

China's State Administration of Foreign Exchange (SAFE), for example, still strictly controls foreign investors' ability to repatriate foreign exchange. This policy, originally created to conserve scarce foreign currency, is an anachronism in a nation with a $1.4 trillion foreign exchange surplus. Yet, not recovering money invested in China ranks among the top concerns of clean energy investors. Dealing with this uncertainty adds months and significant legal costs to project development in China.

Each step in the process generates additional transaction costs, any of which can prove to be a showstopper:

- ❒ The investor cannot make a direct investment in the project but must create a corporate joint venture into which it can invest.
- ❒ The investor cannot easily make a "preferred stock" investment, and thus cannot get a priority return on investment.
- ❒ The investor cannot lend money to the joint venture without also making a major equity investment.
- ❒ Even if the investor makes a major equity investment, a shareholder loan, as previously discussed, generally is not permitted to collect an interest rate equal to the risk involved.

The above constraints are not absolute—there seems always to be some legal work-around. But solving the problems is time-consuming and expensive in legal and consulting expertise. And solving one problem sometimes creates a new one.

The prohibition on preferred stocks usually bewilders foreign investors who are newcomers to China. While preferred shares

represent only about 1 percent of U.S. stock market value, they could be important for foreign investors, particularly when investors are most worried about getting a "return of capital," which is to say simply getting their money back, and preferably to get it ahead of others in line. A "priority return," for example, can be explicitly approved in one form of corporate joint venture (the Cooperative Joint Venture, or CJV) authorized under China's Foreign Invested Enterprise laws. However, a CJV with priority investment return to the foreign investor is not allowed to develop and sell emissions credits under the Clean Development Mechanism.[7]

Confiscatory Tax Policy

Chinese tax policy discourages domestic clean energy production. Over the life of a typical clean energy investment, Chinese government taxes will gobble fully one-third of total revenue. It is ironic that Chinese policy makers write of providing financial and other economic incentives for efficiency and renewable energy, when the tax collector stands first in line, ahead of lenders and investors, to receive his share.

Two major types of taxes affect clean energy production in China. The main revenue producer for the Chinese government is the Value Added Tax (VAT). Unlike the VAT in most developed countries, the Chinese version is not based on "value added," but it operates more like an excise tax. The base rate is 17 percent, and energy efficiency service providers must pay 17 percent of *revenue* as VAT. There are no cost or other deductions from this payment, and it is very difficult to avoid. Coal producers, meanwhile, pay only a 13 percent VAT.[8]

The second type of tax affecting clean energy production is the corporate income tax. Foreign invested enterprises, particularly those located in economic development zones, have for years benefited from tax holidays from the corporate income tax. Tax

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7. Private communication, Yang Hongwei, director, Clean Development Mechanism Coordinating Committee, Beijing, May 2007.

8. Tax Policy Department, "Briefing of VAT Under China's Tax System," Ministry of Finance of China, 2006.

holidays of two years or more were provided.[9] However, this incentive for foreign investors was removed in 2007.[10] Domestic and foreign investors now find themselves on a level playing field. But the policy change only adds to the tax burden of clean energy. Meanwhile, it misses a chance to provide an advantage to clean energy sources, which, compared with oil or coal, save society money in health and environmental costs.

The Effect of the Clean Development Mechanism

The Clean Development Mechanism of the UN Framework Convention on Climate Change was intended to promote technology transfer from developed countries to developing countries and to encourage investment in clean energy. But, as implemented in China, it does neither very well. Chinese CDM regulations may in fact discourage investment in favor of pay-on-delivery for emissions reduction projects. The CDM may increase the risk to developers in organizing investment in clean energy because it significantly increases up-front costs—the riskiest of all investment risks—and can cause major regulatory delays.

Consider some of the rulings made by the United Nations and the Chinese government for the regulation in China of emission reduction credits, technically known as Certified Emission Reductions (CER) credits, generated under the Kyoto Protocol's Clean Development Mechanism (CDM).[11] A developer of CDM

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9. United Nations Conference on Trade and Development, "Tax Incentives and Foreign Direct Investment," ASIT Advisory Studies, No. 16, United Nations, New York and Geneva, 2000 (results of a global survey by Deloitte and Touche, LLP).

10. *China Newsalert*, PricewaterhouseCoopers, Ireland, mimeo, Issue 1, March 2007, www.pwc.com/ie/eng/pdf/hina_newsalert_tls_mar07.pdf.

11. CERs must be approved by consultants appointed by the United Nations, an in-country regulatory authority approved by the United Nations, and the "Executive Board" of the Clean Development Mechanism, which is administered by the UN Framework Convention on Climate Change.

credits may want to attract investment by offering a low price for the emission credits to an investor who provides the funds necessary to make the reductions possible in the first place. Unfortunately, under Chinese CDM rules, a developer is not permitted to give a discount to a foreign buyer of CERs in return for an advance payment on the CERs. This regulatory approach is intended to protect the value of the emission reduction "resource" available in China, a resource rooted in the inefficiency of energy use in the Chinese economy. However, an investor in producing emission credits takes a risk by putting up money long in advance of the generation of credits. Indeed, that investor can lose all of the money invested. Fundamental economics teaches that the time value of money is such that it is preferable to receive a dollar today than a dollar next year, particularly if one is putting that dollar at risk.[12] Even though advance payments could go a long way toward relieving the credit crunch of clean energy developers in China, the Chinese government does not allow a time-value-of-money credit against the minimum price of the CERs.

Another issue is the UN Framework Convention on Climate Change requirement that a project developer use a "Designated Operational Entity" to oversee the paperwork to obtain Kyoto credits. This entity basically reviews project submissions to see if the applicant has followed the published standard methodology. A developer typically pays more than $50,000 for what may amount to a relatively small amount of routine work, while experiencing long and costly delays in the approval process.

Other equally effective means of oversight could be considered. Real estate appraisers in the United States, for example, earn a fraction of these sums to verify larger transactions. The idea of doing spot-checks, with sanctions for people who exploit the system, might be a more effective alternative. Even the U.S. Internal Revenue Service does not review every tax return, and there is no reason that every CDM project submission should be reviewed.

A curious rule prohibits foreign companies with a majority stake in a company operating in China from qualifying for CDM credits to

12. Ignoring exchange rate fluctuations, of course.

reduce greenhouse gas emissions. CDM credits are officially considered by the Chinese government as a "national resource," and foreigners are not to be encouraged to reduce emissions by using Kyoto credits in China.

In addition, the UNFCCC, thanks to well-intentioned but perhaps misguided instincts, requires "additionality" be proved to qualify for CERs. The purpose of this rule is to ensure that Kyoto credits not reward "free riders"—investors or customers who would have done the projects anyway. By analogy, an oil company in China could get the marginal price for a barrel of oil only if it were new oil, or "additional" oil, that would not have been produced if the price had not climbed above $90 per barrel. Stated otherwise, oil producers could charge only the cost of their production plus some small markup. This requirement is reminiscent of "cost-plus pricing," very much like old Soviet-style economies and sure to produce what economist János Kornai called the "economics of scarcity."[13] But, of course, in China today, oil and coal producers can charge the marginal price for their products, even as producers of emissions reductions are regulated by the UNFCCC as if they were factories from a planned economy.

China does have some latitude in the way it chooses to implement the CDM. Project developers would benefit from:

- ❒ Encouraging investment equity investment (rather than pay-on-delivery)
- ❒ Enhancing credit
- ❒ Simplifying transactions and reducing uncertainty and the costs of approval
- ❒ Reducing the burden of monitoring and verification in the CDM approval process

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13. János Kornai, *Contradictions and Dilemmas: Studies on the Socialist Economy and Society* (Cambridge, MA: MIT Press, 1986); and János Kornai, *The Socialist System: The Political Economy of Communism* (Princeton, NJ: Princeton University Press, 1992).

Changes such as these would enable the Kyoto process to more easily fulfill its original intention and promise of spurring investment in clean energy.

Suggested Policy Priorities for Clean Energy Development

Many Chinese policies and practices work at odds with the stated goals and intentions of China's highest-level policy makers. To correct this anomaly, the central government could work with provincial leaders to take decisive action to encourage clean energy investment. Among the most productive and highest priority actions they could take would be to:

- ❒ Exempt clean energy investments from foreign exchange, foreign-invested enterprise, and industrial policy controls
- ❒ Provide VAT and income tax holidays or exemptions for clean energy companies and services
- ❒ Shift CDM from payment-on-delivery to payment-as-investment
- ❒ Make it worthwhile for banks to do risk-based clean energy lending
- ❒ Replicate the successful experience of the IFC in providing loan guarantees for energy-efficiency projects in China
- ❒ Reduce the paperwork necessary to make clean energy investments in China

Chinese leadership has shown courage in taking stands to set tough goals for sustainable energy development. That makes it all the more frustrating that misguided policies, which make achieving clean energy development ever more costly and difficult, remain in place.

About the Authors

William Chandler is a senior associate at the Carnegie Endowment and director of the Energy and Climate Program. Chandler has spent over 35 years working in energy and environmental policy. He is president of Transition Energy and co-founder of DEED Ltd.—private companies with energy efficiency investments in China—and founder and former director of Advanced International Studies at the Joint Global Change Research Institute. He served as a member of the international energy panel of the U.S. President's Council of Advisors on Science and Technology, and was a lead author for the Intergovernmental Panel on Climate Change. Chandler received the 1992 Champion of Energy-Efficiency Award from the American Council for an Energy Efficient Economy for his work and was the first recipient of the Global Climate Leadership Award from the International Energy Agency.

Holly Gwin is general counsel and co-founder of Transition Energy. Gwin served six years in the Clinton administration as general counsel and staff director of the White House Office of Science and Technology Policy, where she reported directly to the President's science advisor. She also worked as staff director of the President's Commission on Gulf War Veterans' Illnesses, and previously served as General Counsel of the U.S. Congress' Office of Technology Assessment. Gwin has published widely in science policy. She holds a law degree from the University of Tennessee and is a member of the District of Columbia Bar.

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