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#### **COVER PHOTO**

This front cover depicts the two “faces” of China’s energy supply—the blackened faces of the coalminers remind us of China’s still overwhelming (70+ percent) dependence on coal to fuel its booming economy. This coal burdens the country with heavy air pollution, degraded water, and the world’s highest rate of mining-related deaths. The wind farm is a “face” of the country’s green energy revolution, for over the past few years the Chinese government’s investments and subsidies into clean energy, as well as increasingly stringent requirements for energy efficiency, renewables and cleaner coal have created an explosion of solar PV and wind power manufacturing.

Photo Credit: Coal Miners - Keren Su/Getty Images; Wind mill farm - istock images

#### **ABOVE PHOTO**

### **Choke Point U.S.: Understanding the Tightening Conflict Between Energy and Water in the Era of Climate Change**

**BENZIE COUNTY, MICHIGAN, JULY 2010:** One of the last wells drilled into Michigan’s Antrim Shale at sunrise. A new and deeper natural gas play appears to be unfolding as developers pay record amounts for oil and gas leases over Michigan’s Collingwood Shale. Drilling deep shales utilizes a practice called fracking that pumps millions of gallons of water and thousands of pounds of chemicals into wells under intense pressure to fracture the rock and release the gas. The rock-punishing practice has produced evidence of serious water contamination in several states, according to ProPublica, a nonprofit investigative news organization. The public concern is emblematic of the choke point that the United States is experiencing as rising energy demand comes into conflict with global climate change and declining reserves of clean fresh water. For more information see the Feature Box on Choke Point: U.S. (page 40), an initiative by Circle of Blue investigating the growing conflicts between energy development and water shortages in the United States. Photo © Heather Rousseau / Circle of Blue



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# CHINA ENVIRONMENT SERIES

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# 金木水火土 CHINA ENVIRONMENT SERIES

## THE CHINA ENVIRONMENT FORUM

For thirteen years, the Woodrow Wilson Center's China Environment Forum (CEF) has implemented projects, workshops, and exchanges that bring together U.S., Chinese, and other Asian environmental policy experts to explore the most imperative environmental and sustainable development issues in China and to examine opportunities for business, governmental, and nongovernmental communities to collaboratively address these issues.

The networks built and knowledge gathered through meetings, publications, and research activities have established CEF as one of the most reliable sources for China-environment information and given CEF the capacity to undertake long-term and specialized projects on topics such as U.S.-China energy and climate network building, environmental justice, creating a Japan-U.S.-China water network, municipal financing for environmental infrastructure, river basin governance, environmental health, water conflict resolution mechanisms, food safety, and environmental activism and green journalism.

The China Environment Forum meetings, publications, and research exchanges over the past year have been supported by generous grants from the Rockefeller Brothers Fund, Blue Moon Fund, U.S. Agency for International Development, Vermont Law School, Western Kentucky University, World Resources Institute, and the ENVIRON Foundation. Jennifer L. Turner has directed the China Environment Forum since 1999 and her assistant Peter V. Marsters just celebrated his first year with CEF.



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# 金木水火土

## FOREWORD

Jennifer L. Turner (a.k.a. 吳嵐), Editor

The two faces of China's energy supply look back at us on this year's *China Environment Series* (CES) cover. The blackened faces of the coalminers remind us of China's still overwhelming (70+ percent) dependence on coal to fuel its booming economy. This coal burdens the country with heavy air pollution, degraded water, and the world's highest rate of mining-related deaths. The wind farm is a "face" of the country's green energy revolution, for over the past few years the Chinese government's investments and subsidies into clean energy, as well as increasingly stringent requirements for energy efficiency, renewables and cleaner coal have created an explosion of solar PV and wind power manufacturing. China is also now the world's leading builder of cleaner and more efficient coal-fired power plants. The Chinese government and business leaders see clean energy technologies as both a solution to the country's coal conundrum and energy security concerns as well as a huge opportunity for China's manufacturers to break into clean technology markets globally. China has notably attracted a steady stream of international investments—many from U.S. companies—into not just solar and wind, but also into relatively experimental technologies such as carbon capture and sequestration.

While the United States still produces some of the most cutting edge renewable energy technology in the world, the country invested half as much into clean energy as China in 2009. While some U.S. states—particularly California—have created a policy environment to encourage clean technology, overall, wind

farms and solar power plants in the United States are hindered by the lack of energy and climate legislation that could create incentives for clean energy producers and consumers. While China's energy needs are driven by a booming economy and massive urbanization, the United States also faces pressure to create new energy sources and update outmoded infrastructure, for by 2020 nearly one-third of all coal-fired power plants will have to be retired. While some non-conventional energy sources are being promoted in the United States as a strategy to lessen the country's dependence on oil and coal, some of these energy investments are taking a heavy toll on water resources. For example, biofuel production can use up to 6,000 times more water than conventional gas production (See Circle of Blue's photo and anecdote on the inside front cover).

### THIS ISSUE'S CONTENT

China's success in promoting clean energy technology has been a hot story over the past year as we pulled together this special Energy and Climate issue of CES, which ambitiously aspired to take a snapshot of major energy trends in China and understand some of the complexities in the U.S.-China energy and climate relations. This eleventh issue is our biggest yet, due not just to my inability to say no to paper proposals, but also because of the dynamism in clean energy developments in China and the many exciting advances in U.S.-China energy cooperation in the government, NGO, and business spheres.

**Joanna Lewis** opens up this issue with an article to help us grasp the magnitude and complexities of the energy and climate relationship between the United States and China—the world’s two largest energy users and CO<sub>2</sub> emitters. Her nine-page table detailing the evolution of the energy agreements and cooperation for the past 30+ years is an invaluable reference. I am so pleased that two busy scientists at Lawrence Berkeley National Laboratory—**Lynn Price** and **Stephanie Oshita**—took the time to write us a feature article that details China’s progress in promoting energy efficiency in the Chinese industrial sector, which uses 70 percent of the country’s energy and thus is the major driver of China’s CO<sub>2</sub> emissions. It is becoming clearer that carbon capture and sequestration is going to figure prominently in China’s strategy to develop a low carbon economy, and **Craig Hart** and **Liu Hongwei’s** feature article offers us insights on some of the drivers, challenges, and current pilot projects in this complex emerging technology. In the fourth feature, **Zhang Xuehua** uncovers a little known “green bounty hunters” initiative that while not yet widespread in China, has the potential to greatly increase citizens’ role in environmental enforcement. While her article describes a single case study, it is nestled inside a wonderful review of the state of environmental governance at the local level—making this feature an update of sorts to Ken Lieberthal’s article in CES 1, which I believe still remains one of our most oft-cited articles!

Our commentaries section sparked a rich collection of research and reflections from NGO activists, researchers, government representatives and students in China, Europe, and the United States. The energy-related commentaries touch on progressive policies and projects targeting some of the heaviest CO<sub>2</sub> emitting industries in China—cement (**Angel Hsu, Neelam Singh, and Song Ranping**); buildings (**Xu Wei and Don Anderson**); and the aluminum industry (**Louis B. Schwartz and Ryan Hodum**).

The reporting and discussion surrounding China’s wind and solar power development over the past year have vacillated from praise for the Chinese government for catapulting the country into a clean technology leader to condemnation of unfair trade practices in subsidizing renewable energy. No single article can resolve this debate, but **Derek Vollmer’s** lead commentary on the potential for U.S.-China renewable collaboration, which draws on a newly released National Academies of Science/Chinese Academy of Social Science report, offers some balanced discussion on some of the challenges and opportunities in China’s renewable development.

Pollution commentaries cover the intractable toxic algae pollution of Lake Tai (**Marcy Nicks Moody**); the growth of production of toxic flame retardants in China (Arlene Blum); and the growing public opposition to incinerators in China’s cities (**Zhao Ang and Mao Da**). **Wang Jian** and **Jonathan Aloisi** delve into the seriousness of Beijing’s huge water challenge and argue how major reform is needed to rationalize water management in the city. **Hu Kanping** provides a great and sometimes humorous example of Beijing’s need for water reform in his examination of the capital’s booming bath industry.

I always welcome commentaries that highlight how grassroots groups and citizens are playing a larger role in strengthening environmental governance in China and under this theme we have commentaries on green supply chain work by the World Environment Center (**Gwen Davidow**); stories of three Sichuan-based NGOs working to protect soil and water resources as a way to help farmers and the environment (**Jiong Yan, Hongyan Lu, Lei He, Jun Tian, and Yu Luo**); and examples of how citizens have been starting to utilize China’s open environmental information measures (**Hu Yuanqiong**). A couple commentaries touch on how communities are being impacted by climate change—such as



One in five people in the world depend to some degree on water originating in Hindu-Kush Himalaya, often referred to as the Third Pole. Glacier melt from climate change threatens to undermine the stability of the millions in Asia who depend on water flowing from this region. The Valley of the Marshyangdi River in Annapurna, Nepal (pictured) is but one region facing growing droughts and floods. Learn more about the growing threat of humanitarian disasters at the Third Pole in a new publication coauthored by *chinadialogue*: *The Waters of the Third Pole: Sources of Threat; Sources of Survival*. Photo Credit: John Jackson – [www.tabd.co.uk](http://www.tabd.co.uk)

**Zhou Lei** who discusses how communities living in the shadow of the Mingyong Glacier in Yunnan Province understand the melting of this glacier on one of Tibetan Buddhism’s sacred mountains and **Pan Wenjing** from Greenpeace China who highlights some encouraging examples of farmers pursuing eco-farming that helps them adapt to coming climate changes.

Guangdong is China’s economic powerhouse and it is encouraging to once again have a commentary by **Christine Loh** and her team at Civic Exchange (**Megan Pillsbury, Andrew Lawson, and Mike Kilburn**) providing some new information on the National Development and Reform Commission’s Green Plan for the Pearl River Delta. Two commentaries also thoughtfully reflect on China’s greening during the economic downturn (**Leo Horn-Phathanothai** and **Elizabeth Balkan** with **Michelle Lau**).

The 17 Feature Boxes that are nestled between feature articles and commentaries should not

be overlooked, for they include succinct and anecdote-rich discussions of energy, climate, and conservation trends, projects, and governance challenges in China. Most of the Feature Box contributors are people working on the ground in China from numerous international NGOs—such as **Clean Air Task Force, Regulatory Assistance Project, Center for Climate Strategies, iCET, Institute for Sustainable Communities, chinadialogue, Circle of Blue, International Crane Foundation** and **China Carbon Forum**. Three of the Feature Boxes provide valuable snapshots of bilateral activities by the **British, Danish, and Italian governments**. In the spirit of this issue’s energy and climate theme, some boxes offer insightful information into private sector energy cooperation, such as the box by **Claire Casey** and **John Juech** who discuss the mutual benefits of U.S.–China power sector cooperation and the box by Jonathan Lewis that highlights some of the clean coal technology

cooperation promoted by the Clean Air Task Force. Other boxes by CEF staff discuss two of our current projects—Cooperative Competitors and Building New Clean Water Networks in China—as well as one box on environmental mass incidents in Zhejiang Province.

Our lucky eight Spotlight on NGO Activism in China Boxes offer insights into the impressive work of some Chinese grassroots environmental groups—**GreenRiver**, **Green Stone**, **Green Anhui**, **Green Eyes**, **Green Earth Volunteers** and **Green Camel Bell**. Three powerhouse international NGOs are also included in these boxes—**International Crane Foundation**, one of the first environmental groups to start conservation work in China in the mid-1980s; **International Fund for Animal Welfare**, which has worked for 15 years to improve government conservation and animal management policies in China; **Natural Resources Defense Council**, which has 15 years experience working to promote energy efficiency and address climate challenges in China.

## CEF'S SUPPORTERS

The China Environment Forum (CEF) is a small but busy office. Our current grants have enabled us to dig deeply into three main themes—energy, water, and environmental governance in China.

### Energizing CEF's Energy Work

On the energy front we launched a new initiative—Cooperative Competitors: Building New U.S.-China Climate and Energy Networks in November 2009—the same month Presidents Obama and Hu signed 9 new energy agreements. This initiative—made possible through seed funding from **Blue Moon Fund** and **Rockefeller Brothers Fund**, and support from **USAID** and **Vermont Law School**—builds on CEF's thirteen years of convening dialogues of diverse policy, business, NGO and

research experts to examine China's energy and environmental challenges. Under the first year of Cooperative Competitors work we have held 15 meetings, all examining energy and climate challenges in China and opportunities for U.S. collaboration. Building on these meetings, the CEF team also has begun posting a number of briefs online that attempt to dig even deeper into U.S.-China energy cooperation. We are grateful to the four funders listed above along with the **ENVIRON Foundation** for supporting the printing and staff time for this special energy and climate issue of CES.

### Diving into Water

Water has long been a major focus at CEF and a few funders have enabled us to continue work on China's water issues. We are grateful to the **Center for Global Partnerships/ Japan Foundation** that has supported workshops and meetings on how the U.S. and Japanese governments, NGOs and researchers can contribute to improving water pollution governance in Lake Tai—one of China's most polluted lakes. This past year we received support from the **World Resources Institute** to assist them with developing a water risk assessment tool that will be launched soon online. CEF also concluded our work on environmental health with our friends at **Western Kentucky University** by creating the online multimedia website *Hidden Waters: Dragons in the Deep with Circle of Blue* that examines the challenging karst water challenges in southwest China. This environmental health project was made possible by support from **USAID** and the **ENVIRON Foundation**.

### Investigating China's Environmental Governance

We were excited and honored this year to become a partner with **Vermont Law School** (VLS) on their **USAID**-supported U.S.-China Partnership for Environmental Law, in which CEF is helping VLS in outreach, meetings, and

research on a broad range of environmental governance issues facing China. VLS and CEF also received a grant from the **U.S. Department of State** to set up an Environmental Justice Fellowship, creating a six-week exchange for 18 young environmental NGO, research and legal young professionals (9 from China and 9 from the United States) who wished to deepen their work on environmental justice issues. Over this part year CEF also worked with **Tetratech** on a **USAID**-supported project to carry out a China Environmental Management Assessment.

## OUTREACH ACTIVITIES

Along with its grant specific programming, CEF has continued each year to serve hundreds of environmental professionals in our network who are seeking information, ideas, and partners to carry out their energy and environmental work in China. I do not have space here to list out the many examples of our exciting information clearinghouse work, but I want to highlight one. This summer CEF produced a short video highlighting energy and environmental challenges in China for the **Walt Disney Company**, which will be later posted on our website. Disney generously gave us an honorarium for this video and other work we did for them and we thank them for their support.

## MY TEAM

This publication is a group effort, first and foremost dependent on the enthusiastic professionals in our network who, despite being incredibly busy people, still propose and then write about their work and insights related to energy and environmental issues in China. I also am grateful to the generous reviewers who gave us very valuable comments on the feature articles. Equally crucial in the success of this publication is the hard work of my team. **Pete Marsters** the CEF program assistant juggles

way too many balls in his work balancing our budgets, assisting in fundraising, booking flights and doing other logistics for our meetings. Nevertheless he was still able to find the time and energy to be an efficient managing editor for CES and help me usher this huge issue with all its photos and charts through the editing and layout process. Luckily this year we were able to bring in two sharp-eyed colleagues **Allison Garland** and **Lauren Herzer** from the Wilson Center's Comparative Urban Studies Program to help us out as editorial assistants, lightening our load considerably. The CEF interns are always an integral part of the publication, not only helping in copy-editing, but also in doing some translation of articles that were submitted in Chinese or assisting authors with some supplementary research. Some of them also wrote feature boxes to help cover some topics that complemented submitted articles. This year I want to salute a great crew of interns—**Alan Campana, Kexin Liu, Natalie Matthews, Nick Sternhagen, Lindsey Eckelmann, and Ada (Yue) Wu**. Ada was with us for most of the year we worked on this publication and she was superb in helping some authors with supplementary research. I dubbed Kexin Mr. 911, for he did some excellent final editing and quick writing in the last weeks before we sent the publication for layout. I was bowled over by the creative new layout in CES 11 and would like to heap praise on our graphic designer **Kathy Butterfield** for her inventive design skills.

I am grateful to the **Rockefeller Brothers Fund** for providing the core funding of this publication and for the additional support from the **Blue Moon Fund, USAID, Vermont Law School, Western Kentucky University,** and the **ENVIRON Foundation**.

