

FEATURE BOX

The Clean Air Task Force China Project: U.S.-China Collaboration as a Pathway to Clean Coal Technology

By Jonathan F. Lewis

The Clean Air Task Force (CATF) is working in China and elsewhere in Asia to speed a global transition to low-carbon coal technology, by facilitating the development of joint business ventures between innovative energy companies and research institutions in Asia and the West.

COAL PRESENTS ENORMOUS CLIMATE CHALLENGES...

We need decarbonized coal if we want to stabilize the global climate. Carbon dioxide emissions from coal-fired power stations are the single largest driver of global warming on the planet, accounting for about 40 percent of human-made CO₂ emissions from energy use. If carbon emissions from coal power are not reduced substantially in the next two decades, global warming cannot be effectively addressed.

Coal, however, will remain a key source of energy for years, especially in some of the world's largest economies. The United States and China, which together produce half of the world's coal-fired power emissions, control almost one third of the world's coal reserves and have built their energy sectors around large fleets of coal-fired generating stations. Coal use by China is expected to double in the next 20 years.

... AS WELL AS "CAN'T-MISS" OPPORTUNITIES

Because coal-based power is responsible for such a large share of global CO₂ emissions, the

development and deployment of technologies that allow us to get energy from coal without the emissions will be a huge step toward climate change mitigation.

CATF believes that partnerships between companies from China and the West are crucial to accelerating the commercialization of low-carbon coal-based energy generation. The world's shared reliance on coal creates many challenges—along with some critically important opportunities. Energy companies in North America, Asia, Europe, and Australia have enormous experience and expertise working with coal, and are similarly motivated to develop technologies and techniques that will preserve a role for coal in a carbon-constrained world.

Moreover, the environmental and economic benefits of transitioning to clean energy will be smaller and slower to materialize if Western and Chinese companies do not work together. The climate challenge will be solved by multiplying opportunities for rapid development and deployment of low-carbon generating technologies, not by restricting engagement between companies in the world's most dynamic economies. Investments by one country reduce the cost of that technology worldwide, increasing the likelihood that carbon capture and sequestration (CCS) will be widely deployed in time to help avert the worst consequences of climate change.

CHINA PROJECT— MAIN ACTIVITIES

The China Project at CATF builds on China's current leadership in low-carbon coal technologies that will be essential to addressing climate change and energy security. For example, the first commercial scale integrated gasification combined cycle (IGCC) power plant with CCS, called GreenGen, is under construction in Tianjin and will feature gasification technology developed by the Thermal Power Research Institute (TPRI). TPRI technology is also being used to retrofit a Shanghai power plant with one of the world's largest post-combustion capture systems. An underground coal gasification (UCG) pilot and commercial project (coal to methanol) built by ENN Group in Inner Mongolia is helping to demonstrate UCG's ability to significantly lower the cost of coal-to-power with CCS. Meanwhile, Shenhua Company Ltd. is developing a large-scale geologic carbon sequestration project at a new large coal-to-liquids plant in the Ordos Basin, and the East China University of Science & Technology has successfully licensed its gasification technology to Western project developers (as has TPRI).

Through an ongoing series of meetings, conferences, and briefings in the United States and China, CATF is working to familiarize key companies and institutions in the West with these kinds of projects and, more broadly, with the technological and industrial prowess found in the Chinese energy sector. CATF's efforts have also provided Western technology developers—especially those looking for opportunities to commercialize advanced gasification systems—with a platform for engaging potential Chinese partners.

To coordinate these efforts, CATF founded the Asia Clean Coal Initiative (ACCI) in 2007 and the Asia Clean Energy Innovation Initiative (ACEII) in 2009. ACCI and ACEII have hosted invitation-only Executive Roundtables in

Beijing, Cambridge, Palo Alto, and Hangzhou, and have co-sponsored broader events in the United States and China. The roundtables assemble the most innovative and entrepreneurial companies in the field, and have helped bring about several promising joint enterprises.

This effort—building strategic cross-border partnerships that can reduce low-carbon coal technology costs and accelerate CCS deployment—is the crux of CATF's China Project. By combining the extensive work CATF has done envisioning and developing a pathway to widespread CCS deployment in the United States with our substantial engagement with Chinese energy leaders (spearheaded by CATF's Ming Sung), CATF has played a key role in bringing about some of the most interesting recent ventures between North American and Chinese energy companies. These partnerships include:

- **Southern Company / KBR – Dongguan Tianming Electric Power Company.** The Atlanta-based Southern Company will deploy the KBR-developed Transport Integrated Gasification technology (TRIG) in a commercial-scale coal gasification plant operated by Dongguan Tianming Electric Power Co. in China. Coal gasification systems, including IGCC facilities, are particularly amenable to carbon capture and sequestration because they separate the CO₂ (along with several other pollutants) from the process stream prior to combustion. The terms of the agreement include technology licensing, engineering, and equipment to use TRIG technology at a new 120 MW power plant. Operation is expected to begin in 2011.
- **Duke Energy – ENN Group.** The initial September 2009 agreement between Duke and ENN Group of China promotes joint development of a variety of technologies, from CCS-relevant systems including underground coal gasification to solar, biofuels, and energy efficiency. In a

follow-on agreement, ENN Group agreed to make capital investments in commercial solar projects operated by Duke Energy Generation Services.

- **ZEEP – ENN Group.** Zero Emission Energy Plants Ltd. (ZEEP) and ENN Group reached an agreement in September 2009 to design and construct a commercial-scale power plant in Shandong Province featuring Connecticut-based Pratt & Whitney’s Rocketdyne gasification system.
- **Future Fuels – Thermal Power Research Institute.** Houston’s Future Fuels is the exclusive North American licensee of TPRI’s multi-stage, dry-feed, waterwall coal gasification system, which is also being installed at the GreenGen IGCC project in Tianjin. Future Fuels plans to use the technology at its Good Spring IGCC project in Pennsylvania, which it expects will deliver 270 megawatts of electricity while capturing over 50 percent of the CO₂ output initially and nearly 100 percent by 2020. The companies have also signed an agreement to share technical data from Future Fuels’ Good Spring plant and TPRI’s

GreenGen facility.

- **Duke Energy – China Huaneng Group.** Potential focus areas of technology-sharing that were part of a Memorandum of Understanding (MOU) signed in August 2009 include: (1) clean coal power generation with the focus on IGCC and Ultra Supercritical power generation; (2) CO₂ Capture and Sequestration (CCS) including pre-combustion capture, post combustion capture, enhanced oil recovery, and geologic sequestration; (3) energy saving and emission reduction in coal-fired power plants, (4) renewable energy power generation including wind, biomass, solar and other energy sources. According to a Duke spokesperson, “We both have the scale and mass to push the global industry forward in the development of clean technologies.”
- **HTC PureEnergy – Suntracing Clean Energy.** Canada’s HTC is working with Suntracing in China to demonstrate modular technology developed by HTC that uses CO₂ captured from power applications to produce a fire-suppressing foam; the foam is



Todd Glass, Ming Sung, and John Thompson of the Asia Clean Energy Innovation Initiative consult with a Chinese official during a visit to the Hangzhou Boiler Group in May 2009. The Hangzhou facility is fabricating coal gasifiers for power plants in China and the United States. Photo Credit CATF.

then used to put out coal seam fires, which are common in China and a significant contributor to global CO₂ emissions.

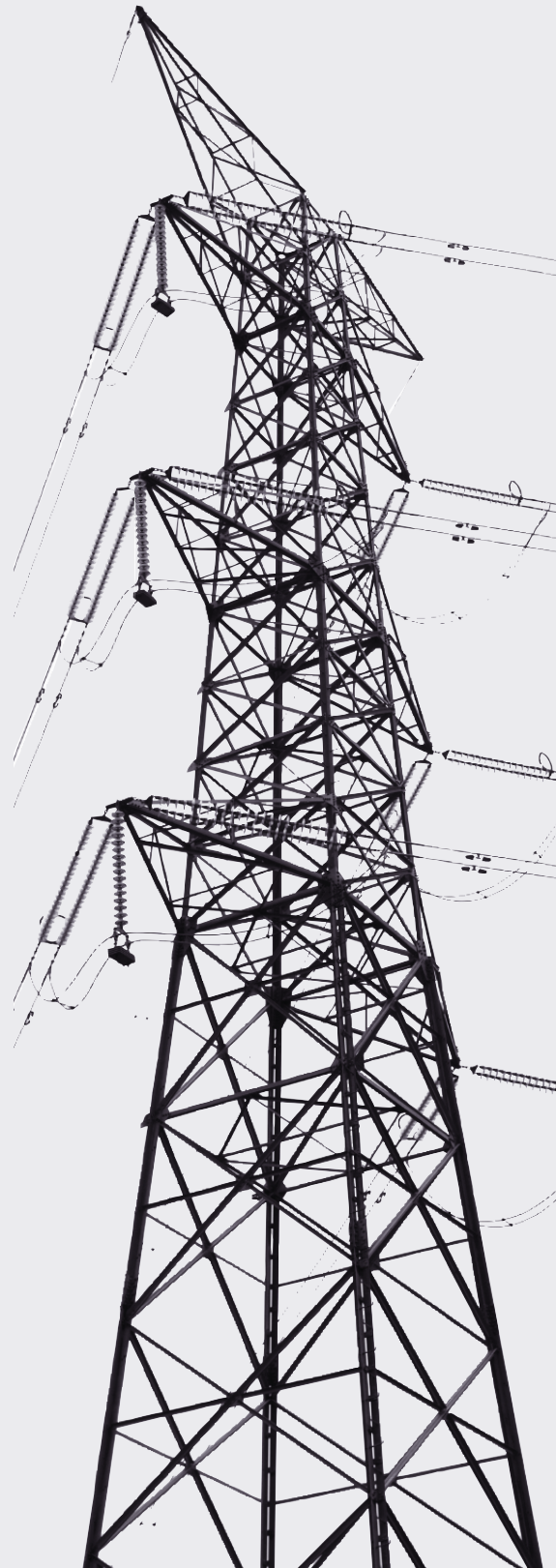
- **Duke Energy – State Grid Corporation (in negotiation).** Duke Energy and State Grid, China’s largest electricity distributor and one of the world’s largest companies in terms of revenue, are reportedly pursuing a partnership to build highly-efficient high-voltage transmission lines in the United States. The venture would also provide Duke with access to financing and to State Grid’s transmission technology and equipment, while State Grid will gain insight into the “smart grid” technology Duke is developing.

In addition to the project facilitation work described above, CATF frequently meets policymakers and key stakeholders in the United States and China to discuss the opportunities associated with CCS-related joint ventures between companies in both countries.

U.S. companies have decades of experience pipelining CO₂ and injecting it deep underground for enhanced oil recovery, and the country’s capacity for entrepreneurship and innovation has produced a range of companies developing advanced CCS technologies. Companies in China are unparalleled in their ability to scale-up technologies quickly and inexpensively. China has more experience with coal gasification (a key CCS technology) than any other country, and it is rapidly commercializing gasification for electricity generation.

The shared reliance on coal creates challenges and opportunities for the United States and China. Energy companies in both countries have enormous experience and expertise working with coal, and are similarly motivated to develop technologies and techniques that will preserve a role for coal in a carbon-constrained world.

Jonathan Lewis is a staff attorney and a climate policy coordinator for the Clean Air Task Force, a Boston-based nonprofit organization dedicated to restoring clean air and healthy environments through scientific research, public education, and legal advocacy. He can be contacted at jlewis@catf.us.



Environmental Mass Incidents in Zhejiang Province

By Ada Wu

2005 was destined to be an eventful year for Zhejiang provincial government officials. On March 10, thousands of people rallied together at Zhu Xi Chemical Industrial Park located in Huashui Township in eastern Zhejiang Province to protest against the pollution caused by a chemical factory. Almost at the same time, more than 3,000 people from Beilun, Ningbo took control of a heavy polluting stainless steel manufacturer for ten days. In 2005, hundreds of villagers in Shengzhou who were angered by the dumping of chemical wastes attacked a pharmaceutical plant and the confrontation evolved into a bloody clash with police. In addition, a lead-acid battery manufacturer was attacked by furious villagers in Changxin County of Zhejiang Province.¹

These four large-scale “mass incidents” were not organized or coordinated by any environmental nongovernmental organization (NGO), yet they occurred almost simultaneously in various parts of Zhejiang. As one of the richest provinces in China, provincial government officials were proud to be the first province in China that announced that no counties in their jurisdiction are in the poverty-county list of the central government. But these environmental mass incidents almost shattered the hard earned reputation that Zhejiang government had been building over the years.

As pressures from local residents and central government were mounting, the provincial government officials felt inclined to reinforce its environmental policies. Four industries

were singled out to be the target of regulatory crackdowns: pharmaceutical, chemical, cement and poisonous matter producers. After the protests, Dai Beijun, director of the Zhejiang Provincial Environmental Protection Bureau, said “Authorities will closely examine the potential effect of industries’ projects on the environment before giving the green light on construction. Companies causing environmental problems will be forced to shut down,” in an interview with English-language newspaper *China Daily*.¹

The crackdown on environmental violators came as Zhejiang Province struggles to balance environmental protection and economic development, a challenge faced by all Chinese leaders. While no one would acknowledge openly the tradeoff between the two, the majority of Chinese officials, from central to local levels, believe that the tradeoff is unavoidable and priority has to be given to economic development rather than promoting environmental protection.

The mass incidents launched by local residents or villagers were not sophisticated or well organized. Protesters’ demands were simple: the polluting factories should stop ruining the people’s land, polluting the rivers and harming public health. They were willing to let the protest get worse or even out of control because it was the only way to let their voice be heard by government. That’s why protesters in one incident chanted the stirring slogan, “We would rather be beaten to death than polluted to death.”³

Whether these protests will herald a major shift toward provincial government's better environmental governance remains to be seen, but these incidents did succeed in grasping the attention of government. They also exerted a chilling effect on the polluting enterprises. For those factory owners, one of the lessons that won't be forgot soon is that if they continue to pollute, they could potentially be torn down by the local people or shut down by government.

Ada Y. Wu worked as a research assistant with China Environment Forum from September 2009 to June 2010. Her research focused on China's environmental and energy policies and US-China cooperation in renewable energy. She is now based in Beijing working at WWF-China. She can be reached at adaywu@gmail.com.

ENDNOTES

- ¹ Zhejiang Mass Incidents Revisited. (November, 2007) Economic Reference. Available: [Online]. <http://www.65et.com/qita/4/2007110916341.html>
- ² Zhejiang Addressed Pollution Problems. (September 2005), China Daily. Available: [Online]. <http://china.org.cn/english/government/140445.htm>
- ³ Democratic deliberation, public participation and environmental governance: A case study of peasant environmental protest in Zhejiang Province. Available: [Online]. <http://www.100paper.com/100paper/zhengzhi/zhengzhixiangguan/20070623/27531.html>

FEATURE ARTICLE

Green Bounty Hunters: Engaging Chinese Citizens in Local Environmental Enforcement

By Xuehua Zhang

China's environmental governance system has long relied on top-down emission standards and penalties to stem the country's rising air and water pollution. But such strategies have often failed due to powerful local governments that protect industries and undermine weak environmental protection bureaus. Besides strengthening pollution regulations, the central government has passed laws and regulations that expand public participation as a tool for better environmental policy enforcement. Such bottom-up public participation strategies have proliferated over the past decade and include complaint systems, expanded rights to participate in environmental impact assessment hearings, and an increased ability to bring polluters to court and access pollution information. There is also a little-heralded cash-reward informant program created in 2000 in Fuyang city in Zhejiang Province that offers insights into how Chinese citizens can be effective watchdogs of polluting industries. In the first few years of implementation, the program generated a large number of valid reports that uncovered the violations committed by 80 percent of the enterprises regulated by local environmental authority in Fuyang. Moreover, this green bounty hunter program has increased the compliance rate of polluting enterprises, improved local air and water quality, and promoted public participation in local environmental enforcement.

GROWING CHANNELS FOR CITIZEN PARTICIPATION

Chinese environmental governance institutions have been a work in progress over the past thirty years, shifting from mainly command-and-control policies to the adoption of new policy tools, market incentives, and open information measures to address the country's growing pollution problems. Another notable trend has been the promulgation of a growing number of laws and regulations that create specific channels for Chinese citizens to be involved in environmental policy processes. While not always fully implemented, channels and institutions for public participation have increased and range from complaint systems to legal rights for pollution victims to bring class action cases, from requirements for public

environmental impact assessment hearings to measures that give citizen rights to access environmental information from government and industries.

The most commonly used channel of participation in China is the environmental complaint system. The system—commonly referred to as “letters and visits” (*xinfang*)—was originally established to provide an avenue for citizens to voice their concerns about environmental protection matters (Warwick, 2003; Brettell, 2003, 2007 & 2008). To make complaints, citizens register concerns with complaint offices within the local people's government,¹ the people's congress, or the environmental protection bureau through visits, letters and, increasingly, telephone hotlines and emails.

The Chinese central government has increasingly emphasized the importance of public participation to improve local environmental enforcement and compliance and has taken some measures to encourage citizens to report environmental violations by polluting sources. In many regions, acknowledging and responding to citizen complaints has become the priority of the local environmental protection bureaus (EPBs).

In 1990, China's lead environmental administration passed the *Regulation Concerning the Management of Environmental Protection Complaints (Huanjing Baohu Xinfang Guanli Banfa)*, which went into effect in February 1991 and required EPBs to establish mechanisms to handle citizen complaints. Some EPBs were making records of complaints even in the 1980s (Brettell, 2003). Starting in 1997, the State Environmental Protection Agency (SEPA, the predecessor of Ministry of Environmental Protection) required that each local EPB establish an environmental hotline, known as "Green 110," to handle citizen reports of potential environmental violations. This hotline was done in cooperation with the local Public Security Bureau (PSB). In early 2001, SEPA set up a unified, toll-free hotline number, 12369, for receiving reports on environmental violations throughout the nation.² Some cities have placed this hotline within the special Citizen Reporting Center, which accepts all kinds of violation reports and distributes them to relevant government agencies.

Reports related to environmental issues are passed along to local EPBs where environmental inspectors are required to be on duty 24 hours a day to accept, inspect, and resolve reports. After resolving reports, inspectors are required to inform complainants of the resolution whenever possible.³ If a complainant is not satisfied with the resolution, he/she can appeal either to EPB officials, local government, or a higher-level EPB. Unlike the traditional system of "letters and visits," which are mostly citizen complaints about noise pollution and other environmental

issues that directly affect them or their property, the environmental reporting system (*huanbao jubao*) encourages citizens to discover and report unlawful behavior of pollution sources.

Cash-Reward Programs Emerge

As the role and importance of citizen participation in environmental enforcement has increased, new programs have been created, including a cash-reward informant program (*youjiang jubao*), in which informants are paid when they report significant pollution violations. These informants are sometimes referred to as "bounty hunters," similar to a green informant program in California.⁴ The first Chinese bounty hunter program emerged in June 2000 in Fuyang city,⁵ a county-level city of Hangzhou municipality in the northwest part of Zhejiang Province, one of the richest coastal regions in China where air and water pollution has become quite severe. (Editor's Note: See Feature Box on Environmental Mass Incidents in Zhejiang in this issue of CES as well as Environmental Mass Incidents in Rural China feature in CES 10 to read more about Zhejiang citizens protesting pollution). Under the Fuyang program, if a citizen's report is valid and results in an administrative punishment including a penalty for the pollution source, the government will grant a monetary reward to the citizen who first notified the EPB. The types of violations that qualify for cash rewards are those which have a large impact on local environmental quality and are often difficult for local EPBs to detect. Noise pollution complaints, which make up a majority of reports through the "letters and visits" program, are not eligible for financial rewards.

By the end of 2003, three and half years since of the start of the program, the Fuyang EPB had received 3,074 reports.⁶ The EPB deemed that 1,103 of the reports were valid and qualified for rewards. As a result, the EPB collected roughly 8.5 million Yuan (\$1 million in 2004) in penalties and granted the informants 1.9 million Yuan (\$237,000) in rewards. As of 2007, a total

of approximately 3 million Yuan of rewards had been issued (*China Environmental News*, 2008). Given a population of 620,000 people and 432 enterprises subject to the reward program in Fuyang, the number of valid reports and the amount of rewards granted are astonishing.

After Fuyang's experience was publicized nationwide, many provinces and cities adopted a similar program.⁷ Jiangsu was the first to introduce a province-wide cash-reward program on February 1, 2001. Subsequently, Zhejiang, Hebei, Shandong, Shanghai,⁸ and Sichuan adopted province-wide programs; each program provides a reward in the range of 200 to 5,000 Yuan. However, not all of the programs appear to be as successful as the Fuyang program in terms of the number of reports received. For example, only 27 reports were received between 2001 and 2003 during the initial implementation of a reward program in Nanjing City (the capital of Jiangsu Province). In Qingdao City, the capital of Shandong Province, only nine reports were received within half a year after a reward program was instituted (*Qingdao Daily*, 2001). In contrast, the Fuyang EPB received 14 reports involving eight polluters during the very first day of the implementation of the program, and citizens continue to participate in the program, even as pollution violations have dropped.

There has been virtually no in-depth investigation of any of these reward programs. This article examines the emergence and impacts of the Fuyang program, how it was created and implemented and what incentives the program generated for the involved parties. Although this paper is only a single case study, it offers insights into future examination of public participation in China's environmental sphere. The primary data sources in the paper are interview notes and EPB documents collected during field research conducted in Fuyang in July 2004. The relevant Chinese journal articles

and media reports are also analyzed to provide additional evidence of the continuing impact of the program.

...the Fuyang EPB received 14 reports involving eight polluters during the very first day of the implementation of the program...

After a brief introduction of the structure and shortcomings of China's environmental enforcement institutions, this article shifts to a discussion of the creation and successes in Fuyang's innovative cash-reward system. The cash-reward system represents a promising mechanism to help strengthen China's weak environmental enforcement. In order to highlight lessons relevant for other cities in China with similar program, the last sections of the article identify the key factors contributing to the successes of the Fuyang program.

INSTITUTIONAL FRAMEWORK OF ENVIRONMENTAL ENFORCEMENT IN CHINA

While the Chinese central government has passed a plethora of laws, regulations, and standards to control pollution, enforcement has always been weak, largely due to powerful local governments and underfunded and small environmental protection bureaus (EPBs). Thus, for the past three decades the Chinese government has been building the foundation for a more comprehensive organizational infrastructure to circumvent powerful local governments in order to better enforce environmental laws, regulations, and standards (Jahiel, 1998; Moore & Warren, 2006). The National Environmental Protection Agency (NEPA) was officially upgraded to a ministry-level agency in March 1998 and renamed SEPA. Ten years later in 2008, China's environmental

watchdog was further upgraded to the Ministry of Environmental Protection and given a ministerial rank. However, since the program investigated in this study took place before 2004, SEPA is used in the rest of this paper. Under SEPA, every province, autonomous region, city, and county has a local EPB responsible

...many polluters simply turn on the pollution control facilities when EPB inspectors arrive—even for “surprise” visits—and switch them off once inspectors leave.

for policy implementation. As of 2008, approximately 3,000 EPBs with about 180,000 staff members were working at the sub-national level throughout the China (MEP, 2009).

Like most local government agencies in China's unique bureaucratic system, local EPBs must be responsive to two leaders: the administratively higher tier environmental institutions and the local governments where they reside (Lieberthal, 1997). Under this “dual leadership,” EPBs at and below the provincial levels serve as SEPA's enforcement agencies, responsible for monitoring, keeping records, and collecting fees. SEPA and provincial EPBs provide city EPBs with policy directives and guidance for the implementation of national and provincial environmental laws and regulations. District and county EPBs are below the city level in the Chinese institutional hierarchy and receive guidance from city EPBs. However, it is local governments, not the higher tier environmental agency that provide local EPBs with their annual budgetary funds, approve institutional advancements in rank, appoint the bureau directors, determine increases in personnel, and even allocate such resources as cars, office buildings, and employee housing (Jahiel, 1998). The local government is the more powerful of a local EPB's two administrative leaders.

Each EPB usually includes an administrative office and its subsidiaries, such as environmental inspection stations, which are mainly responsible for administrative enforcement of environmental regulations. In principle, local EPBs have jurisdiction over: (1) issuing warnings, fines, unlawful gains confiscation, and stoppage of production or use orders; (2) revoking permits (or permit-like certificates); and (3) ordering enterprise closure or relocation. EPBs, in turn, entrust environmental inspection stations with this task; the stations can then apply

sanctions within their entrusted jurisdiction in the name of the EPB. However, in practice, the EPB does not have jurisdiction for the use of the severest sanctions—closing down a polluter, revoking its discharge license, or ordering it to stop production. For the use of these sanctions, only the respective local governments have jurisdiction.

The main tasks of an EPB inspection station include: (1) on-site inspection of polluting sources; (2) collection of pollution levies; (3) investigation of environmentally polluting and destructive accidents; and (4) assistance for investigating and settling environmental disputes within an EPB's jurisdiction.¹⁰

EPB inspection stations have spent a substantial amount of their resources on conducting extensive on-site inspections of polluting sources.¹¹ There are two types of EPB on-site inspections—routine and surprise. Routine inspections are scheduled regularly—once a month for key polluting sources and less frequently on medium- and small-scale polluters—or can be more thorough announced inspections to facilities, which typically involve a comprehensive examination of how well pollution control facilities are working and whether various environmental requirements are being met.

The surprise inspections can be initiated by EPB inspectors themselves or by complaints from citizens. The purpose of EPB-initiated surprise inspections is to discover the illegal behavior of polluters. The most commonly identified violations are non-operation of pollution control facilities and illegal discharge of pollutants. However, it has been increasingly difficult for EPBs to uncover these violations, for many polluters simply turn on the pollution control facilities when EPB inspectors arrive—even for “surprise” visits—and switch them off once inspectors leave.

Unannounced inspections triggered by citizen complaints started becoming more common in the mid-1990s. Interviews of EPBs in three provinces during my 2004 fieldwork revealed that many regions have transferred the entire responsibility of accepting and handling complaints and reports to the local inspection stations. Since EPB inspection stations are generally understaffed and underfunded, they have increasingly depended on citizen complaints to detect environmental violations. One city EPB reported that in 2002 citizens identified about 60 percent of the administrative penalties.¹² The Fuyang cash-reward informant program was created to enhance the effectiveness of citizen complaints in uncovering substantial violations and encouraging the continuous compliance with environmental requirements by polluters.

LAUNCH OF FUYANG’S GREEN BOUNTY HUNTER PROGRAM

The idea of creating an economic incentive for citizens to uncover significant environmental violations emerged under a special political, social, and environmental circumstance. The Fuyang EPB with local government support created a green bounty hunter program to support an ambitious national environmental campaign that required all enterprises to meet emissions standards by the end of 2000. The

creation of this cash-reward program also reflects the Fuyang government’s commitment to tapping public participation in order to improve environmental enforcement and compliance.

To supplement its enforcement efforts, the Chinese government frequently launches nationwide campaigns focused on raising environmental awareness and punishing polluters.¹³ On August 3, 1996, the State Council issued *the Decision on Several Problems Concerning Environmental Protection*, hereafter referred to as the Decision.¹⁴ The Decision contains two main goals. The first stated that all 15 types of small polluting enterprises should be shut down before September 30, 1996. This policy is usually referred to as “The Fifteen Small” (*shiwu xiao*). (See Box 1 that defines this and other green “number” policies and standards).

A second goal was to have all of China’s industrial enterprises meet the national and regional standards by December 31, 2000, known as “Meeting Two Standards” (*shuang dabiao*). Unlike the “The Fifteen Small” campaign, this one was directed at larger industrial enterprises, many of which were still state-owned and had not been targets of previous enforcement actions. It required that the local government at the county level or higher close, stop production or relocate industries with pollution discharges exceeding the limits.

The Decision brought a landmark change in environmental enforcement. Although it left the responsibility for the implementation of the two goals with the local governments, the State Council explained how the goals were to be met. In particular, the severest administrative sanction to counter industrial pollution was to be used: abatement deadlines, to be followed by the forced closure of polluting industries. Before the Decision, this sanction was rarely used. Local EPBs often had great difficulty in seeking the local government’s approval to either close down or stop production of heavily polluting enterprises. The Decision planted the seeds for the success of the national campaign.

Drivers of Fuyang's Reward Program

The Fuyang city government issued abatement deadlines to a total of 461 enterprises. Among them, 120 were listed as key pollution control enterprises. By end of 1999, the city invested 83 million Yuan (\$10.3 million) in industrial pollution control. About 299 enterprises installed pollution reduction facilities. However, a significant number of enterprises that constructed control facilities and met the abatement plans did not operate the facilities on a regular basis or maintain them. In order to reduce production costs, many enterprises turned the facilities on during EPB inspections and switched them off after the inspectors left. Untreated discharges, whether intentional or accidental, were very common.

In addition, paper mills formed the backbone of the Fuyang's industrial structure and the number of small-scale paper mills grew rapidly.¹⁵ It was extremely difficult for the Fuyang EPB to ensure full compliance with the "Three Synchronizations" (*santongshi*) pollution control requirements among those small enterprises. Some new projects or expansions of existing projects started operating without meeting the requirements (See Box 1). In addition to the problems with paper mills, some small polluting enterprises that were ordered to close down were reported to have reemerged.¹⁶

As a result of these enforcement gaps, the environmental quality in Fuyang city continued to decline and the number of citizen complaints continued to rise. Mr. Hongtai Guo, the former

Box 1. DECIPHERING THE NUMBERS BY ADA WU AND XUEHUA ZHANG

In the course of issuing countless environmental policies, regulations, and campaigns every year, the Chinese government often gives them names with numbers that can be easily remembered and used in slogans. Some of the policies mentioned in this article are explained below.

The Fifteen Small Enterprises (*shiwu xiao*) is a policy that refers to 15 types of small polluting enterprises that were identified in State Council Decision on Several Problems Concerning Environmental Protection issued in 1996. They are usually heavily polluting township and village enterprises (TVEs). They include small paper manufacturers that produce less than 5,000 tons of paper from raw materials and less than 10,000 tons of paper from chemical pulp a year; small tanneries that treat less than 30,000 hides a year; dye factories that produce less than 500 tons of dye a year; coking enterprises and sulfur smelting enterprises using backward technologies; enterprises that use backward methods to smelt arsenic, mercury or lead-zinc, oil refinery without being approved by State Council, gold extraction factories; factors that produce pesticides without permission, bleaching and dyeing service providers, backward electroplating factories; and enterprises that produce radioactive and asbestos products.

Meeting Two Standards is a campaign that was part of the 1996 State Council Decision that put forward three goals: (1) all industrial pollution sources must meet national and local emission standards; (2) key environmental protection cities must meet air and water quality standards; and (3) several major catchments had to carry out water pollution control according to the local catchment's requirements. The first and second targets were to be met

Box 1. CONTINUED

by the end of 2000, which is why the campaign is called “Meeting Two Standards.”

Three Synchronizations is a unique pollution control policy that was first mandated in 1973 and later incorporated into the 1979 (trial) and 1989 (revision) of China’s Environmental Protection Law. This policy aims to ensure that all the new construction projects include pollution abatement facilities that meet state emission and effluent standards. This program requires that design, construction, and operation of pollution treatment facilities be conducted at the same time as the design, construction, and operation of the overall project. It also applies to major expansion or retrofitting of the existing plants.

Two Lines of Revenue and Expenditure Rule was first proposed by the State Council in 1993 and applicable to all government agencies. It requires that all non-tax fees collected by government agencies go to local finance bureaus as a part of local revenue. Each agency then proposes an annual budget to be approved and allocated by the finance bureaus of local governments. According to this rule, local EPBs are responsible for issuing a pollution levies or penalties, which are then paid through local banks to the finance bureaus. The money is listed as environmental protection fund in the local government annual budget and allocated for pollution treatment. Thus, EPBs can no longer directly keep a portion of the levies and penalties collected for their own use. Disconnecting EPB budget allocations from levy and fine collection was supposed to help local EPBs to focus their enforcement efforts on supervising polluters and reducing pollution instead of on generating revenue.

Party Secretary of Fuyang city (1999–2003), was so concerned about the situation that he asked the Fuyang EPB to seek legal support for creating a cash-reward program.¹⁷ Recognizing the insufficient enforcement capacity of Fuyang EPB, he sought to utilize the 620,000 Fuyang people to help detect severe violations. Mr. Guo believed that the public, who had strong concerns about Fuyang’s industrial pollution, would be motivated to uncover and report such violations if a reward was set high enough.¹⁸ The watchful public eyes would in turn strengthen EPB enforcement and improve the compliance rate.

Through careful examination of the related legal provisions, the Fuyang EPB concluded that there was sufficient legal support for establishing a cash-reward informant program.¹⁹ Article 6 of

the *Environmental Protection Law* explicitly grants Chinese citizens the right to legal remedies: “Citizens have the right to make a complaint or an accusation against work units or individuals who pollute or damage the environment.” Article 8 stipulates, “Local governments should reward working units and individuals with outstanding contribution in protecting and improving the environment.” In addition, Article 34 of the “Rules for Environmental Letters and Visits” issued by SEPA in 1997²⁰ clearly states that local EPBs can honor or reward citizens who discover and report unlawful environmental practices that help improve local environmental protection work. The laws appear to have left it up to local discretion to determine the form of rewards.

Design and Implementation of the Program—Citizens Begin to Fill Enforcement Gaps

On June 5, 2000, the Fuyang city government and Party Committee decided to jointly launch a cash-reward informant program built on the existing environmental reporting system in order to improve compliance and to consolidate the aims of the national campaign that required all enterprises to meet emissions standards by the end of 2000. Immediately following this decision, the government issued the *Notice of Conscientiously Carrying Out Environmental Protection Work by Mobilizing All Societal Forces*, henceforth referred to as Notice, and detailed implementation rules.

The Notice became effective on June 15, 2000. Any citizen who first reports the following four types of environmental illegal behaviors is entitled to a cash reward. Under these circumstances, those citizens are regarded as environmental informants.

- Violating “Three Synchronizations” requirements.
- Not operating or not regularly operating pollution control facilities.
- Resuming production without EPB’s approval. This often applies to “The Fifteen Small” enterprises that were ordered by the city government to close down or to stop production.
- Not meeting abatement deadlines but nonetheless continuing production. This often applies to enterprises that were given abatement deadlines by the city government.

The scope of the rewards program was designed to ensure the long-term effects of the national campaign. As one interviewee pointed out,²¹ in practice, the people who obtain rewards are mainly the ones reporting on illegal discharges of wastewater.²² Under this green bounty hunter program citizens were encouraged to report the reemergence of the 15 types of small enterprises that do not operate

polluting treatment facilities on a regular basis. The program also addresses violations of the “Three Synchronizations” that are mostly related to small-scale paper mills. In total, there are 432 enterprises in the chemical engineering, paper, dye, and electroplating industries that are subject to the program and these are the main enterprises in Fuyang. The Fuyang rewards program opted to focus on this limited range of violations and did not incorporate all the kinds of violations specified in China’s expansive environmental laws and regulations.²³

At the start of the program, the reward was 1,500 Yuan (~\$185) for problems that occurred at night (12 to 6 a.m.) and 1,000 Yuan (~\$125) for daytime violations. The penalties charged to polluters as the result of a citizen’s report ranged between 5,000 and 50,000 Yuan (\$630–\$6,300).²⁴ The reward for night problems was higher because such pollution events are considered more difficult for citizens and regulators to discover. No evidence shows that the size of a reward was set by any theoretical or economic calculation. Mr. Guo, then Party Secretary, recalled that the size was set to be 1.5 or 2 times the monthly salary of an average employee in Fuyang city in order to provide a sufficiently high monetary incentive.²⁵ Meanwhile, the Fuyang EPB also decided that the size of a reward should be in the middle range of the rewards established by other governmental agencies such as Public Security Bureau, Anti-Corruption Bureau, and People’s Procuratorial Bureau. Those rewards were generally in the range of several hundred to 2,000 Yuan.²⁶

Finalizing the Reporting Infrastructure

Paralleling the cash-reward program, in 2000 the Fuyang EPB established a special 24-hour hotline (63318301) for informants. This hotline proceeded SEPA’s national hotline (12369) that was established in 2001. Fuyang maintained the old number as well for citizens were already familiar with it. When receiving a report,

inspectors are required to arrive on site within an hour (two hours for remote areas) to carry out an investigation. Once the report is verified, the informant is given a cash reward within 10 days. If an enterprise continues to discharge pollutants that exceed standards 24 hours after being reported and investigated, citizens can report the violation again and obtain another reward. If the same enterprise is caught three times violating emission standards the EPB is supposed to take severe measures.²⁷

Informants can also report to the local People's Procuratorial Bureau

(PPB) if EPB officials: (1) neglect to investigate a citizen pollution report, (2) give confidential information to the enterprise under investigation, or (3) reveal the identity of the informant. The PPB can issue disciplinary sanctions to EPBs that are found guilty of these violations.

The EPB drafted about ten implementation rules including the *Acceptance and Inspection Procedures and Security Rules*. All these detailed rules, together with the Notice, lend solid support to the EPB's implementation of the program and guarantee its legitimacy.

Before full implementation of the program in June 2005, the Fuyang EPB repeatedly published a notice advertising the bounty hunter program in the *Fuyang Daily* and broadcast it on the Fuyang TV station several times a day for five days in order to increase publicity. Simultaneously, the EPB established a command center and a rapid response system. In the first month after the cash-reward program was established, all 60 EPB staff members were required to work on the program.²⁸ Seven special teams were established to: (1) accept citizens' reports and conduct and supervise on-site inspections, (2) make legal examinations and analyze monitoring results, and (3) release news about successful reports.

After a one-month trial in June 2000, an environmental reporting center was formally established and staffed by a total of 21 EPB employees, essentially all the staff of the Fuyang Inspection Station, who formed three groups working in rotation to accept and handle the flood of reports.²⁹ The center was equipped with two cars, six cameras, and one video camera.

In the first six months of the program (June

In the first month after the cash-reward program was established, all 60 EPB staff members were required to work on the program.

to December 2000) 332 of the total 544 reports were found to be valid and actionable pollution violations. Citizens continued to turn in reports in the subsequent three years that this study examined, but the rate of valid reports were highest (61 percent) in the first half year.³⁰ The reports in the first six months indicated that approximately 80 percent of the enterprises in Fuyang were continuously in violation of pollution emission standards.³¹ As it became apparent that large numbers of enterprises were concealing their unlawful emissions, in 2001 the Fuyang city government raised the reward to 3,000 Yuan a day to fire up the enthusiasm for citizens to be informants. Again, there was no solid reasoning or analysis regarding why the reward was raised to that level. According to Mr. Guo, the reward increase mostly demonstrated the determination and confidence of the Fuyang Party Committee and city government to control pollution and improve local environmental quality.³²

CATALYZING A VIRTUAL CYCLE: OUTCOMES OF THE BOUNTY HUNTER PROGRAM

Table 1 below shows the basic statistics of the

Fuyang program, which reveals no obvious decline in the number of reports over the first four years. However, the percentage of valid reports did drop dramatically likely due to several factors.³³ First, Fuyang EPB officials noted that there had been a huge drop in illegal discharge of wastewater due to increased environmental awareness of entrepreneurs. Second, a growing number of polluting industries were willing to correct mistakes when they discovered that wastewater treatment facilities were not operating normally. Third, some informants withdrew their reports when an EPB investigation revealed there was no illegal discharge of wastewater.

The decline in valid pollution reports and potential explanations suggest that the reward program has worked well. The Fuyang EPB interviewees in my 2004 fieldwork provided a detailed account of their perceptions of the success of the program.³⁴

Improvement in Operations of Pollution Treatment Facilities. The Fuyang EPB claims that pollution treatment facilities were operated more frequently after the start of the bounty

hunter program. By 2003, the EPB found through their routine supervision that the normal operation rate of the treatment facilities had increased from 30 to 95 percent. Over the first four years, citizen watchdogs reported on approximately 80 percent of the enterprises within the city. The Fuyang EPB officials believed that the active public participation in the bounty hunter program was a substantial motivator for nearly all the city's enterprises to comply with pollution control laws. For example, many enterprises established an operation responsibility system for pollution treatment facilities and designated one or more full-time employees to operate the facilities and made efforts to fix design and construction problems at their facilities. Some enterprises even started voluntarily notifying the EPB when facilities broken down or needed repair to avoid violating the pollution emission rules.

Rising Environmental Quality. The Fuyang EPB claims that the air and water quality in the city have notably improved since the implementation of the bounty hunter program.

TABLE 1: OUTCOMES OF THE FUYANG PROGRAM, JUNE 2000 - DECEMBER 2003

Time Period	Number of Accepted Reports	Number of Valid Reports	Percentage of Valid Reports	International Advanced Level	Received Penalties (USD)
June-Dec. 2000	544	332	61	83,000	415,000
2001	782	318	40		
2002	916	252	27	74,000	344,000
2003	832	201	24	79,500	296,000
2007	138	32	23	n/a	n/a

- Notes:
1. The data were drawn from Fuyang EPB. 2003. Procedure, Institution, Rules, Summary, and Notice of the Cash-Reward Informant Program Compiled by Fuyang Inspection Station.
 2. "Valid reports" are the ones that are proved to be true after on-site investigation. Some of them might not be in the scope of the reward program. It is unclear what the percentage of the valid reports is subject to a reward and how many informants actually received the rewards. My 2004 fieldwork indicates that some informants refused to accept the money.

Before 2000, the water quality of the two small rivers running through the city was listed as class five quality—the next to lowest ranking of water quality.³⁷ With reporting from informants, the EPB discovered and closed down 13 severely polluting enterprises located along one of the two rivers (*People's Net*, 2001).

By 2003, the water quality of the river with many plant closings rose to class three quality and that of the other to the class four quality. In addition, many citizens have observed the improvements in air quality. It is difficult to prove

that the rewards program is directly responsible for all the drops in pollution, as the city was simultaneously implementing other pollution control policies. However, EPB officials regarded the bounty hunter program as a significant improvement in their enforcement capacity, and enterprise managers also claimed the program pressured them to meet the standards.

Enthusiastic Participation by Citizens—A “Virtual Cycle.” The Fuyang EPB believes that the program has greatly improved public participation in local environmental enforcement and has increased public confidence in the local government. Some citizens not only strived to report environmental violations in their neighborhoods but also traveled to remote areas and rivers to find violations. The EPB’s fast response to reports in terms of quick investigation and timely issuance of rewards largely inspired the general public to discover and report violations. The program also demonstrated the local government’s strong commitment to strictly punish environmental violations, which in turn, increased the public’s confidence in the local government and EPB.

Professionalization of Informants. Some citizens in Fuyang became professional informants, specializing in discovering and reporting valid violations in the city within the program’s first year. The Fuyang EPB considered this trend an indicator of the program’s success.

More than 10 professional informants were involved in reporting pollution during the first three years of the program. One professional informant received a total of \$12,500 rewards in 2003 alone. Another one successfully reported more than 10 violations within the first four

With reporting from informants, the EPB discovered and closed down 13 severely polluting enterprises located along one of the two rivers

months of the program and was rewarded about \$2,500. This informant mentioned that he even thought about registering as an environmental reporting company.³⁸ Though detailed information on individual informants is strictly confidential, the Fuyang EPB interviewees described the following characteristics of informants, which offer insights into these empowered citizens.

- Most of the informants are farmers and not whistleblowers from inside the polluting company.
- Though some informants reported violations and refused to receive money, most informants participated to get rewards.
- Many informants started reporting violations in their neighborhoods.
- Professional informants equipped themselves with necessary tools such as bikes, motorcycles or cars and carried cameras and emergency lights.
- Professional informants managed to increase the accuracy of their reporting by learning about the polluting conditions of enterprises, relevant environmental knowledge, regulations, and policies. Some established close contacts with the Fuyang EPB.
- Many informants often went searching for violations at night, which is a common time for enterprises to illegally discharge pollutants.

- Some of the professional informants developed special tactics to effectively catch violators. One claimed that he paid close attention to the polluting enterprises exposed by the media. While most people might think these enterprises would subsequently comply with regulations, he watched them closely and actually caught one enterprise three times in a row after it was cited in the newspapers.

While this paper is an in-depth review of the initial three and a half years of the Fuyang program, it merits mention that the Fuyang EPB has continued this bounty hunter program and views it as an effective deterrent to polluters. According to a *China Environmental News* (2008) report on the Fuyang bounty hunter program, the number of citizen reports on polluters has continued to decline significantly. In 2007, the Fuyang EPB received 138 reports and only 32 of them were verified to be valid. The report attributed the decline in reports to the effectiveness of the bounty hunter program. Over the first seven years of the program vigilant citizens—some of whom refused the reward payments—had forced polluting enterprises to increase investments in wastewater and air emission control facilities and to improve the operation and management of those facilities and helped improve the water quality in Fuyang.

KEYS TO THE REPORTED SUCCESSSES OF THE FUYANG PROGRAM

The key factors contributing to the success of the Fuyang program in generating a large number of citizen reports (many of which were valid) and helping to turn around water degradation trends include: solid local government support, guaranteed funding for rewards and the program operation, sufficient implementing resources, publicity, transparency, and confidentiality.³⁹

Solid Governmental Support⁴⁰

When Fuyang decided to provide a monetary incentive for environmental reporting, the Fuyang city government, party committee, and EPB were prepared to sacrifice 2 to 3 percent of GDP growth.⁴¹ This is a fundamental departure from the dominant practice of “economic development first, environmental protection second” in many Chinese cities. There was an intense debate among the leaders of the city government and party committee before this consensus was reached. The supporters, under the leadership of the former Party Secretary Mr. Guo, believed that a reward program would impose tremendous pressure on the paper mills, the major polluters that caused the severe water pollution at that time. They also argued that adopting such a program demonstrated the determination of the city government and party committee to control pollution. More importantly, Mr. Guo highly valued the merits of public participation and regarded the public as an under-utilized enforcement resource. The threat of being reported and exposed by the public increased compliance among potential polluters and spurred the Fuyang EPB to boost its enforcement efforts.

Opponents argued that a reward program would increase the production cost of enterprises and reduce their competition in the market. This would in turn affect negatively the city GDP, which is a key indicator of the city government performance. They also argued that the program would hurt enterprises’ cooperation with the government. In addition, the program would effect the reelection of prominent leaders in the city government and party committee. Many entrepreneurs whose enterprises would be subject to scrutiny under the reward program are representatives with voting power.⁴²

As indicated previously, there are no explicit legal provisions in the existing laws and policies that prohibit a bounty hunter program, but it is up to local government discretion to issue regulations to create such a program to

empower citizens. In theory, local EPBs in China could issue a departmental rule guiding a reward program. But EPB rules do not have strong legally binding force and polluting enterprises could ignore the rules if the local government does not back them up. Thus, a bounty hunter program's legitimacy depends on strong regulation and support from the local government.

The former Party Secretary was fully aware of the importance of the unified support of all major leaders in the local government. He summoned four formal meetings to discuss the advantages and disadvantages of a reward program and encouraged an open discussion in the local media. No opponent was willing to openly express his opposition to the program in public. Several months later, the last meeting reached a consensus to carry out the reward program.

Guaranteed Funding

As the Fuyang experience shows, granting rewards in a timely manner is important to keep the program effective. It is also essential to ensure credibility. When a reported violation is verified, the EPB is required to grant a reward within 10 days, which is usually before an administrative penalty is actually collected. The fast payment of rewards cannot be guaranteed without sufficient funding.

A guaranteed funding source is particularly important given the fact that an EPB does not directly collect penalties. *The Management Regulation of Collection and Utilization of Pollution Levies* (Management Regulation) promulgated by the State Council in 2003 stipulates that all EPB's revenue and expenditures have to strictly follow the rule of "Two Lines of Revenue and Expenditure." According to the Management Regulation, local EPBs are only responsible for verifying violations, assessing and issuing a pollution levy or penalty, and demanding that polluting enterprises to pay. Levies and penalties are actually paid directly to local banks and

finance departments. All EPB expenditures are locally financed with local government approval, which places stringent limitations on an EPB's use of money to pay informants in the reward program.⁴³

To obtain funding for rewards, local EPBs need either to budget estimated expenditures at the beginning of a year or to apply for extra funding after rewards are granted. Both approaches need local government approval. The second approach leaves the EPB much more vulnerable. If enterprises do not pay penalties—a common phenomena in many regions of China—the EPBs would be unable to get reimbursed by local governments. As one interviewee pointed out, local governments might simply refuse to reimburse EPBs because there is no explicit legal provision for such a reward in the Management Regulation.⁴⁴ As a result, EPBs might well end up paying informants out of their tight budgets.

To ensure sufficient funding, the Fuyang city government set up a special fund that came entirely from local finances and is used only for rewards and the operation of the program. This way, the issuance of rewards is unrelated to penalties the reward program generated.

Sufficient Implementing Resources

The program implementation and the vast volume of reports indicate a compelling demand for human resources.⁴⁵ The complex procedures of accepting, investigating, resolving, and responding to reports have imposed a significant amount of extra monitoring, inspection, and administrative burden on the Fuyang EPB. For example, the Fuyang government established a special enforcement institution—an environmental reporting center with 21 staff. The center was equipped with necessary inspection materials such as cars and cameras.

The lack of enforcement personnel is a widely identified problem in China (Sinkule & Ortolano 1995; Jahiel, 1994; Zhang, 2001).

While the Fuyang EPB appeared to have more enforcement personnel compared with EPBs in other regions at the same time, the interviewed EPB inspectors admitted that the reward program has made the shortage of enforcement personnel even more keenly felt. The Fuyang EPB actually had to hire additional staff in the first year of the program. They were able to do so as a result of the strong government support that led to extra funding designated to the program operation. With proper training, the additional staff was assigned to accept phone calls, work on logistics and paperwork, and assist EPB inspectors in on-site monitoring and inspection. This significantly reduced the EPB's workload and made more effective use of the already constrained enforcement resources.

Publicity, Transparency, and Confidentiality

Fuyang EPB officials emphasized that publicity and transparency are crucial to the success of the Fuyang program.⁴⁶ The Fuyang EPB spent five days intensively publicizing the program in local newspapers and TV stations before formal implementation. As a result, many citizens became familiar with the specific provisions and procedures of the program, which provided a solid basis for wider public involvement.

To help citizens identify the violations that are qualified for a reward, the Fuyang EPB regularly publishes the list of polluting sources that were ordered by the city government to close down or to stop production, as well as those that were given abatement deadlines.⁴⁷ This provides essential information for citizens to effectively locate the potential violators. The Fuyang EPB also publishes updates on citizens' reporting, EPB investigations, and resolutions in the local media quarterly.⁴⁸ This puts pressure on polluting enterprises and increases the transparency of the program. Some polluting sources were reported to beg the EPB not to disclose their identities and violation behaviors in the media.⁴⁹ To many Chinese companies,

the bad publicity that comes from being tagged as a pollution violator in the bounty hunter program is often more important than the fines that are applied.

While publicity and transparency are quite important to the success of the Fuyang program, they could not be achieved without cooperation from local media. All media in China is controlled by the state. Without approval from the local government, a program is not able to receive extensive coverage from mainstream sources. This reinforces the importance of local government support.

The confidentiality of informants' identities is also crucial in generating a sense of security for informants and maintaining their participation in the program. To protect informants, the Fuyang EPB formulated a rule governing confidentiality. The *Detailed Implementation Rule* clearly states that "the staff members who need to know an informant's identity...cannot disclose the relevant information to anyone (including families and other EPB staff) at any time or place."⁵⁰ The rule also stipulates that "other governmental employees who are not directly involved in the reward program cannot use any excuses to inquire into any information on informants and how the reports are handled from any informed staff."⁵¹ Fuyang EPB staff claims that there has not been a single case where an informant's identity was disclosed to a reported enterprise.⁵²

REFLECTING ON BROADER APPLICATION

Environmental governance in China has long been dominated by top-down policymaking that has attempted to circumvent powerful local governments and force better compliance. The national government has increasingly emphasized the importance of public participation and established a national hotline to accept and handle complaints, mandated industries and local governments to disclose pollution

information, and required that citizens be given the right to participate in environmental impact assessment hearings—these and other policies serve to empower citizens.

Fuyang's cash-reward informant program is unique in that it was a local policy innovation—admittedly created to sustain the outcomes of the 1996 national campaign that required all polluting sources to meet emission and effluent standards. Although it was a top-down requirement that catalyzed this ambitious green bounty hunter program, it was local officials who made it a sustainable program that even today is helping to reduce pollution and increase citizen involvement in environmental governance.

Key to the program's success was the former Party Secretary who helped shepherd the program's development so it was sustainable, transparent, and sufficiently staffed and funded. Ultimately, the other key to the program's success was the citizens' enthusiastic response, which bespeaks a growing desire of Chinese citizens to be proactively involved in environmental governance. This desire to participate was built on China's long-standing environmental complaint system, which is still the most commonly used channel for public participation in China's environmental enforcement. As pollution protests continue to grow in China, the Fuyang program, while unique, does offer a model for Chinese local governments to better enforce pollution control laws and increase public confidence in the local government.

ACKNOWLEDGEMENTS

Dr. Zhang wishes to thank Emmett Interdisciplinary Graduate Program in Environment and Resources for financial support that made the field research involved possible, Mr. Yang Shubiao for providing critical access to the Fuyang EPB, and Wang Wei for field research assistance.

Xuehua Zhang is an independent consultant in environmental, climate, and energy issues. Dr. Zhang

received her Ph.D. from Stanford University's Emmett Interdisciplinary Graduate

Program in Environment and Resources. She has extensive research and work experience in the formulation and implementation of environmental and climate policies with a focus on environmental monitoring, compliance, and enforcement. Her recent research examines the role of citizens and courts in local environmental compliance and enforcement under China's Administrative Litigation Law, the management practice of continuous emissions monitoring system, and effects of the cadre evaluation system in achieving China's energy saving and pollution reduction targets. Dr. Zhang has provided consulting services to a variety of governments, academics, and international organizations such as the Chinese Ministry of Environment, U.S. Environmental Protection Agency, World Bank, Energy Foundation, Vermont Law School, Environmental Defense Fund, and Natural Resources Defense Council. She can be reached at: xuehua@stanford.edu.

REFERENCES

Jahiel, Abigail R. (1994). *Policy Implementation through Organizational Learning: The Case of Water Pollution Control in China's Reforming Socialist System*. Ph.D. dissertation, University of Michigan.

Jahiel, Abigail R. (1998). "The organization of environmental protection in China." *The China Quarterly*, no. 156, p. 757-787.

Brettell, Anna. (2007). "China's pollution challenge: The impact of economic growth and environmental complaints on environmental and social outcomes." In *Challenges Facing Chinese Political Development*, ed. Sujian Guo and Baogang Guo (Lanham: Rowman & Littlefield Publishers, Inc.).

Brettell, Anna. (2008). "Channeling dissent: The institutionalization of environmental complaint resolution." In *China's Embedded Activism: Opportunities and Constraints of a Social Movement*, eds. Peter Ho and Richard Louis Edmonds (New York: Routledge).

Brettell, Anna. (2003). *The Politics of Public Participation and the Emergence of Environmental Proto-Movements in China*. Dissertation, University of Maryland.

China Environmental News. (2008, August 6). "The first cash reward informant program in Fuyang: Less reports but better environment." [Online]. Available: http://www.cenews.com.cn/xwzx/gz/qt/200808/t20080805_588532.html.

China Environmental Yearbooks. (2004-2008). Ministry

of Environmental Protection.

Fuyang Inspection Station. (2003). *Procedure, Institution, Rules, Summary, and Notice of the Cash-Reward Informant Program*. Fuyang EPB.

Lieberthal, Kenneth. (1997). "China's governing system and its impact on environmental policy implementation," *China Environment Series*, v. 1, p. 3-8.

Liptak, Adam. (2007, June 11). "Environmental bounty hunters, on trail of cash, are in California official's sights." [Online]. Available: http://select.nytimes.com/2007/06/11/us/11bar.html?_r=2.

Ministry of Environmental Protection. (2009). *2008 Bulletin of China's Environmental Statistics* (in Chinese). [Online]. Available: http://zls.mep.gov.cn/hjtj/qghjtjgb/200909/t20090928_161740.htm.

Moore, Allison & Adria Warren. (2006). "Legal advocacy in environmental public participation in China: raising the states and strengthening stakeholders." *China Environment Series*, Issue 8, pp 3-23.

People's Net. (2001, December 29). "An environmental cash-reward informant program." [Online]. Available: <http://www.people.com.cn/GB/guandian/183/7181/7182/20011229/638119.html>.

Qingdao Daily. (2001, December 17). "Why did the environmental cash reward Informant Program Encounter Dilemma?" [Online]. Available: http://www.qingdaonews.com/big5/content/2001-12/17/content_503337.htm.

Sinkule, Barbara J. & Leonard Ortolano. (1995). *Implementing Environmental Policy in China*. Westport/London: Praeger.

State Council. (1996). "State Council decision on several problems concerning environmental protection." *Environmental Work News Report*.

Van Rooij, Benjamin. (2002). "Implementing Chinese environmental law through enforcement," in "Implementation of Law in the People's Republic of China." (Eds.). Jianfu Chen, Yuwen Li, & Jan Michiel Otto.

Warwick, Mara. (2003). *Environmental Information Collection and Enforcement at Small-Scale Industrial Enterprises in Shanghai*. Ph.D. dissertation, Stanford University.

Zhang, Xuehua. (2001). *Institutional Constraints on China's Environmental Enforcement*. Masters Thesis, Western Washington University.

Zhou Zhaomu & Zhou Xiang. (2003). "Practice and exploration of establishing a public cash-reward informant mechanism in Fuyang City." *China Environmental Management*.

ENDNOTES

¹ Here a local government means a governmental body, which has authority over a local EPB in the same jurisdiction. For example, at municipal level, a complainant can appeal to mayor's office, municipal People's Congress, and municipal Party Committee.

² *China Environmental News*, July 27, 2001 reported that all regions that already established other environmental

telephone hotlines such as "Green 110" are required to gradually switch to "12369." In particular, provincial EPBs and EPBs in key cities are required to have "12369" installed before July 31, 2001. Other EPBs at and above county levels should do so before December 31, 2001.

³ If a complainant refuses to disclose her or his identity and does not call back demanding a resolution, EPB inspectors are not obligated to deliver the resolution.

⁴ According to a *New York Times* report (Liptak 2007), California deputizes bounty hunters, who get to keep a quarter of any penalties they recover for the state to help enforce environment laws.

⁵ Fuyang is a county-level city under the jurisdiction of Hangzhou City. In some large Chinese cities, there are some counties with relatively large population. They are referred as cities but are equivalent to counties, which are one-tier lower than cities in the Chinese administrative hierarchy system.

⁶ The data in this paragraph are drawn from a document published by the Fuyang Inspection Station (2003).

⁷ The information in this paragraph on the adoption of a cash reward informant program throughout the nation is largely drawn from *China Environmental Yearbook: Environmental Supervision Information* (2004-2008).

⁸ Shanghai, Beijing, Tianjin, and Chongqing (after 1997) are the centrally controlled municipalities in China. Geographically, they are not provinces. Politically and administratively, they enjoy a status equivalent to provinces.

⁹ Other EPB subsidiaries could include monitoring stations, research institutes, environmental engineering companies, environmental propaganda and education centers and environmental information centers.

¹⁰ The "Provisional Rules for Environmental Supervision Work" were issued by NEPA in 1991.

¹¹ The discussion in this section is drawn from the interviews with the Fuyang EPB officials.

¹² Notes from the author's 2003 field trip in Zhenjiang City of Jiangsu Province.

¹³ This section largely draws from Zhou & Zhou (2003). The first author was the vice-director of Fuyang EPB who was responsible for the implementation of the program and the author was able to interview him during the field research in 2004.

¹⁴ The official reasoning for initiating this national campaign was increasing environmental degradation and the low environmental compliance rate (State Council, 1996).

¹⁵ Interview: 040310.

¹⁶ This problem is not unique in Fuyang. Together with the non-operation of pollution control facilities, they are the widely identified problems in maintaining the long-term effects of the national campaign throughout the entire nation. For details, see Benjamin Van Rooij, (2002).

- ¹⁷ According to an EPB official (Interview 0407131), it was indeed Guo's idea to create a reward program.
- ¹⁸ Interview 0407161.
- ¹⁹ Interview 0407131.
- ²⁰ It is the most important rule (revised in 2006) dedicated to all types of environmental complaints such as letters, visits or phone calls. The rule defines the rights and responsibilities of both complainants and EPBs and can be found at: www.sdein.gov.cn.
- ²¹ Interview 0407121.
- ²² In fact, wastewater discharges are usually continuous. Therefore the illegal discharges often maintain for a while and are easy to discover and be verified by the EPB. In contrast, air pollutant emissions are often instantaneous. The illegal emissions do not last very long and usually stop when the EPB rushes to the sites.
- ²³ An examination of legal liability sections of all environmental laws and regulations would reveal many violations of polluting sources that were not included. Examples could be reporting false polluting information, illegal import of toxic substances from overseas, and removing pollution control facilities without EPB's approval.
- ²⁴ Interview 0407122.
- ²⁵ Interview 0407161.
- ²⁶ Interview 0407131.
- ²⁷ It is unclear what severe measures might be in this specific program. The term "severe measures" usually appears in Chinese laws and policies and grants the government considerable discretion to handle extreme cases.
- ²⁸ Interview 0407131.
- ²⁹ Interview 0407131. It was mainly due to a decrease in the volume of reports.
- ³⁰ Fuyang EPB (2003).
- ³¹ Interview 0407161.
- ³² Ibid.
- ³³ Fuyang EPB (2003).
- ³⁴ Interviews: 040310, 0407131, 0407161, 0407121, 0407122.
- ³⁵ Notice that this is one-time compliance rate, not the continuous compliance. The frequency of EPB routine inspection on one polluting source is four times a year at maximum.
- ³⁶ Interview 0407161.
- ³⁷ According to China's water quality standard, water quality is ranked from the cleanest (1st) to the worst (6th).
- ³⁸ This informant gave up the idea because he was afraid of exposing himself to polluting sources. In addition, the Industrial and Commercial department did not have a precedent to go by and did not know which regulation or rule should be applied to register such a company. This information was provided by EPB interviewees. EPB officials refused to let me interview any informants in order to fully ensure the confidentiality of those informants' identity.
- ³⁹ According to the original purpose of the reward program, whether the program was truly successful should be evaluated based on whether or not it has improved local environmental quality. At minimum, whether the program has truly improved the compliance rate of polluting sources should be assessed based on more reliable empirical data, instead of the Fuyang EPB's judgment. However, the relevant data are not available for analyzing the probable relations between reporting and compliance with available data at the present. So I used the number of the reports as a very preliminary indicator of the success of the program.
- ⁴⁰ This section is mostly drawn from the interview 0407161 conducted with the former Party Secretary of Fuyang city Mr. Hongtai Guo, who created and supported the reward program.
- ⁴¹ This seems to suggest that massive violations of the environmental laws were going on.
- ⁴² Interview 0407161.
- ⁴³ Levies have been the major funding source of local EPBs since the implementation of the pollution levy system. Before the Management Regulation, local EPBs were able to directly collect levies and enjoy considerable discretion for usage.
- ⁴⁴ Interview 0402121.
- ⁴⁵ This section is mostly drawn from the interview 0407131.
- ⁴⁶ Interviews: 040310, 0407131, 0407161, 0407121, 0407122.
- ⁴⁷ Interview 0407122.
- ⁴⁸ Interview 0407131.
- ⁴⁹ Ibid.
- ⁵⁰ Article 8 of the work discipline of the "Detailed Implementation Rule of the EPB's Reporting Center."
- ⁵¹ Article 9 of the work discipline of the "Detailed Implementation Rule of the EPB's Reporting Center."
- ⁵² This claim is difficult to believe given the fact that EPBs and enterprises have a long-established cooperative relationship. But it is hard to verify without interviews with informants.