

Xiaoxi and Xiaogushan CDM Hydropower Projects: Report from a Field Trip, November 2008

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I. Introduction

Hydropower is expanding quickly in China – very quickly. In just the western province of Gansu, for instance, planners anticipate that around 200 hydro dams will be built in the next five years. Many Chinese hydro projects have applied to receive carbon credit income from the Kyoto Protocol's Clean Development Mechanism. As of 1 November, 2008, 729 Chinese hydro projects representing 22,489 MW of capacity had applied to the CDM.

According to Kyoto Protocol rules, to receive CDM credits projects must be judged “additional” – in other words, the dams are only being built because of the benefits they receive from being eligible to sell CDM credits.

Because of the high environmental and social risks associated with large dams, the EU has passed legislation stating that CDM credits from hydropower projects larger than 20MW can only be used in the European Emissions Trading System (ETS) if the projects comply with the recommendations of the World Commission on Dams (WCD). These recommendations focus on ensuring that dam projects are superior to other options for supplying water or electricity before starting construction, gaining public acceptance of projects, holding developers accountable for their commitments to local communities, and minimizing their harm to ecosystems and endangered species.

The German government has taken the lead on establishing a process for assessing WCD compliance of CDM hydropower projects. The government requires German companies that intend to buy CDM large hydro credits for use in the ETS to commission a third party to assess WCD compliance.

German power utility RWE, one of the biggest CO₂ emitters in Europe, intends to buy CDM credits from numerous large hydro projects in China. RWE has commissioned certification company TÜV SÜD to write WCD compliance reports for the Xiaoxi and Xiaogushan dams. TÜV SÜD has ruled both projects WCD compliant. (TÜV SÜD was previously hired by the developer of Xiaoxi to validate its eligibility for the CDM. It gave the dam a positive validation).

Xiaogushan Dam was “registered” (approved) by the CDM Executive Board in 2006. Xiaoxi’s application for approval was stalled in October 2008 when the Executive Board requested a review of the project’s validation on several grounds related to additionality.

The aim of this report is to present findings relevant to judging whether the Xiaoxi and Xiaogushan hydropower stations are indeed likely to be WCD compliant. We also make some remarks relevant to the issue of additionality. It is not the aim of this report to make an argument for or against the expansion of hydropower in China (or, for/against particular dam projects).

II. Xiaoxi Hydropower Station

A. Background

Xiaoxi Hydropower station is situated on the Zishui River in China's southeastern Hunan province. The total installed capacity of the dam is estimated at 135 MW. The project is owned by Hunan Xinshao Xiaoxi Hydropower Development Co., Ltd.



Xiaoxi Hydropower station, Hunan province

Financing and “additionality”?

The decision of the dam owners to apply for CDM funding came *after* they encountered serious problems in construction. The original plans for the dam had been approved, as per Chinese law, by the Hunan Provincial Development and Reform Commission, the Hunan Water Bureau, and the Hunan Environmental Protection Bureau. The dam owner then secured funding and construction was set to begin in late 2003 or 2004. However, the original blueprints failed to adequately address the engineering challenges of construction at the dam site.

Namely, the dam site is located along a fault-belt, which is responsible for the dramatic peaks and valleys in this part of central Hunan province. According to meeting minutes of the hydropower company, dated February 26, 2004, the challenges are described as follows:

“Geological problems found in the dam site exploration are beyond our former imagination ... Faults, interlayer disturbance and joint slits were developed in the dam area, and 24 faults of various sizes have been found, among which 11 faults pass the dam base of the major buildings ... the dam base of the project falls into the category of V type rock, which is featured by seriously crushed rocks and problems such as existence of sliding movement, non-uniform sinkage and deformation, leakage of dam base and susceptibility to erosion.”

The project owners made the decision to employ a different dam technology and to apply for additional funding from the CDM as well as GEF (Global Environment Facility). The

owners made the case that they were ill-equipped, financially and technically, to complete the project without outside assistance:

“Since the Project is the first one in China to employ anchor pile technology for dam base treatment, design consultants lacks the relevant experience and construction company lacks the necessary experiences also, resulting in both the enormously increased difficulty of implementing the technology adopted by the project and the apparent increase in related costs incurred.”

The meeting minutes, however, do not explicitly state that it would have been impossible to finance completion of the project without outside assistance, but rather note that:

“[Our company’s] current situation [is] that the expected IRR [initial return on investment] of the project is poor. It is lower than the 8% benchmark of the electric power industry and much lower than the common level of the industry.”

Whether the situation can best be characterized as one of necessity or of desire to maintain profit levels, the project owners at this moment turned to CDM resources. In either instance, it is worth asking whether supporting a previously financed, but flawed or mismanaged project fits the definition of “additionality.” The significant problems encountered with the original plans should also call into question the soundness, technical expertise, and/or independence of the agencies charged with approval and oversight of the project – this includes oversight of environmental and social impacts.



Xiaoxi Hydropower station, Hunan province

Lack of independence in EIA process

In order to judge current review procedures, some background is required. In China, environmental impact assessments are commissioned and paid for by companies seeking to build new projects. They are then approved by local environmental protection bureaus, which are subordinate to local governments that stand to collect tax revenues from project operations. As Dr. Yu Xiaogang, director of the Kunming-based NGO Green Watershed, explained:

“The EIA must be conducted by a so-called ‘qualified’ institute. But since this institute is hired and its fees paid for by the developer, there is no independence.”

It cannot be assumed that an environmental protection bureau will have latitude to act as an independent arbiter. Nor can a fair “outside” validation of a dam’s impacts lean on documents and analysis supplied solely by the project owner and local government. However, extensive independent analysis is often not undertaken. For instance, the “WCD Compliance Report” of Xiaoxi prepared by TUV SUD listed as *Verification Proposal 1*:

“We propose to check the formal acceptance report published by EPB [environmental protection bureau] after the first year of operation of the power plant.”

In the case of Xiaoxi Hydropower station, an environmental impact assessment was commissioned by the hydropower company and subsequently approved by the Hunan Environmental Protection Agency in April 2005.

B. Field Visit

Forced displacement and impoverishment

Flooding upstream of the dam required 7,563 people to be resettled, according to documents prepared by the government and cited by the TUV SUD report (no independent estimates have been made).

Most of these people were farmers whose land was submerged when the dam was built. Several were relocated to a new street built adjacent to Xiaoxi village. Here are some excerpts from interviews with about two dozen villagers:

>> A young female restaurant worker said: “It was in September 2004. The government told my family: ‘You will have to move out of the village, or we will force you. You have no choice.’ We did not know where we would move. The government destroyed all our neighbors’ houses, then paid families some money according to the price of their old house. We took that money and built a new house here. About 20 other families on this street also moved from the village.”

>> The mother of the restaurant worker, who ran their household, further explained: “The people who owned good houses didn’t want to move. The people who owned bad houses wanted to move out. At first, when we heard we would move and have a new house built, I was not upset. We were poor before. But now I feel it is not better. It is worse.”

In response to further questions, she explained that during the dam construction period, there had been an influx of laborers to the town. Her household had taken advantage of

the short-term boom in activity with their restaurant, but when construction would be finished – likely before the next Spring Festival in February – she did not know what they would do. “We may have to close the restaurant,” she said.

Among resettled persons interviewed, most fared much worse than these restaurant workers. Many villagers, who had known nothing but farming all their lives and did not have the resources to start new businesses, currently had no land to farm and no employment. They said the government had not provided them with alternative skills training or help finding new work.

>> One former farmer in his 50s said: “I have nothing to do but play cards. Plan for the future? I have no plan. We are ordinary people. We cannot fight the government. The government will do anything they can do to force you to obey.”

>> A former rice farmer in her 40s said: “I have nothing to do now, but only cry.”

Although their situations and reactions varied, the common denominator is that they were not involved in the decision-making process. Most said that their incomes and quality of life were significantly lower than before the dam was built.

(The TUV SUD validation report of the dam confirms that villagers were not involved in decision-making, but asserts that most were happy with final outcome – referencing a survey *conducted by the dam operator*.)

Lack of transparency & potential for corruption in compensation scheme

One villager reported that the government took control of his property to use as storage space during construction. The first year he received 1200 RMB as compensation. Now he receives 800 RMB annually. He doesn't know why the amount has changed, or indeed what amount he should receive. He only knows what the local government gives him. Like many others, he suspects that some money is skimmed off the top. He is dissatisfied because the payment is lower than what he would earn farming the land.

In Xiaoxi, as elsewhere in China, land is not owned by individuals but by the local government; farmers hold titles to work on their lands. As with many resettlement and compensation schemes, money is paid by the dam owner to the local government (i.e., the land owner) – which is then charged with dispersing it to villagers. The management of compensation payments is not transparent and there is no independent oversight, leaving the door open for mismanagement or corruption.

Several villagers in Xiaoxi voiced concerns about how their homes were appraised. They said they had no idea how much they were entitled to receive – they only knew what amount they were given.

No avenues for complaint

A final concern raised by villagers was that they felt they had no safe and effective channels to voice their concerns or complaints about the dam. For instance, dam construction has resulted in lowered water tables downstream of the dam (previously groundwater was replenished by periodic flooding, but the dam has changed the hydrology of the area). This has rendered unproductive some wells and irrigation channels downstream of the dam – making it difficult for farmers with impacted fields to continue their livelihood. However, concerns voiced about the availability of water have not been addressed. As one man explained:

“We have made many requests. Different [government] offices say different things, but they all have the same opinion: This is not my job; you should turn to other department.”

C. Additional Images



Entrance leading to Xiaoxi Hydropower station (above); promotional sign posted near dam site (below)



筱溪水电站鸟瞰图

筱溪水利水电枢纽工程概况

筱溪水利水电枢纽工程是以发电为主，兼有航运、灌溉、旅游、养殖等综合效益的大(II)型水利水电枢纽工程。枢纽工程主要由大坝、发电厂房、通航设施三部分组成，水库控制流域面积15843平方公里，多年平均流量407立方米/秒，多年平均来水量129亿立方米，正常蓄水位198米，总库容1.4亿立方米。大坝最大坝高47米，坝顶长度340米；电站装机4台，总装机容量13.5万千瓦，多年平均发电量5.035亿千瓦时；工程设计工期四年，投资总额约12亿元，2004年10月下河围堰，首台机组2007年年底投产发电，2008年工程全部竣工。

III. Xiaogushan Hydropower Project

A. Background

Xiaogushan Hydropower station is situated on the Heihe River in China's western Gansu province. The total installed capacity of the dam is estimated at 85 MW.

The project is owned by Xiaogushan Hydropower Company and has received financing from the local government and the Asian Development Bank, as well as CDM. A report and recommendation for financing was submitted to the ADB Board on Directors in 2003 and subsequently approved.



Xiaogushan Hydropower station, Gansu province

Financing and “additionality”?

Gansu is among the provinces in China where hydropower is growing fastest, and it is among the top recipients of CDM financing. According to interviews with the Gansu Provincial Water Bureau, twenty years ago there were only three large dams operating in the province. Today there are about 600 dams total. The provincial government expects that around 200 more dams will be built in the next five years. Further, the government encourages dam operators to seek investment from “diversified sources”; new dams in Gansu therefore receive significant funding from both domestic and international sources.

Although it is nearly impossible to prove or disprove the “additionality” of a particular project, it stands to reason that if large and attractive dam projects did not receive CDM funding they would stand a good chance at securing alternative or domestic investment. In this regard, China presents a far different scenario than countries such as Laos or Cambodia, where international funding may be the only avenue to enable large infrastructure projects.

It also stands to reason that, in Gansu, the “best” dams (i.e, those most likely to meet WCD standards) will be most encouraged to submit applications for CDM funding. Xiaogushan, for instance, previously received funding and technical advice from the ADB, which came with certain stipulations. By some criteria, this dam outperformed the *other six* dams located on a relatively short stretch of the Heihe River. (During onsite interviews, nearby villagers reported some level of consultation and financial benefits

resulting from Xiaogushan, but not from nearby dams supported by domestic funding.)

The relevant point is that CDM investments in projects such as Xiaogushan may be freeing up domestic capital for investment in other dam projects, which are not currently monitored by the international community or held accountable to WCD standards.

Lack of independence in EIA process

An environmental impact assessment was performed by Gansu Environmental Protection Research Institute -- a subsidiary body of the Gansu Environmental Protection Bureau. This document was then approved by the Gansu Environmental Protection Bureau. The same procedural concerns about the lack of independent oversight in the EIA process raised in the case of Xiaoxi apply here.

B. Field Visit

Located in previously degraded environment

The drive up the mountain road that wound through the gorge toward the project site looked like a scene out of a *Star Trek* movie: Stark cliffs with little sign of life plunged dramatically into the snaking Heihe River.



Barren cliffs near dam site

The EIA and subsequent “compliance” documents concluded that dam construction would have minimal environmental impacts on such an apparently inhospitable landscape. For instance, the “WCD Compliance Report” prepared by TUV SUD notes:

“There are basically no trees and bushes in the mountain on both banks of the river in the project area. There are only scattered spots of grass kinds with coverage of about 15%. In the project area there are no state valuable, rare and endangered species of animals ... The monitoring on aquatic organism in 17 km long reach of the project indicates that no fish resources have been found.”

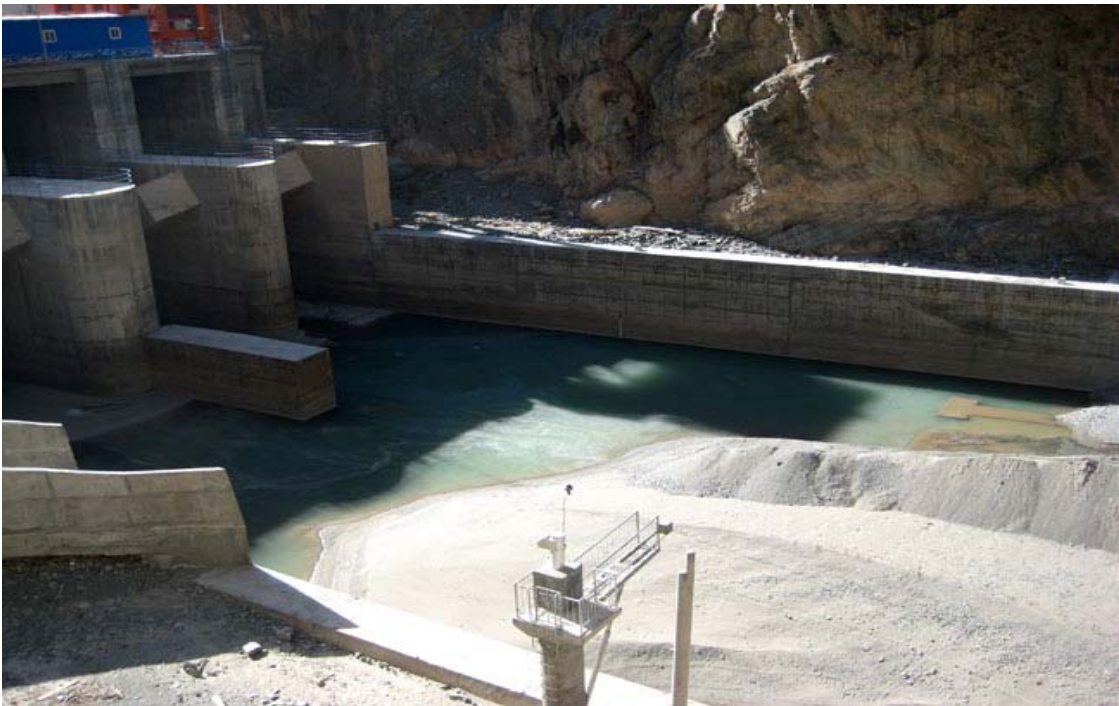
However, as interviews with professors of environmental science at Lanzhou University revealed, this barren landscape is not the natural state of the environment. Photographs of nearby hillsides that do support vegetation should help make this clear. The current environment is severely degraded. Beginning in the 1950s (with the national call to increase steel production through backyard furnaces), deforestation proceeded at a rapid pace, especially along riverbeds and inhabited regions. One 94-year-old woman living in nearby Bajiaowan village, adjacent to the dam monitoring station, said she did remember when there were trees on the hills surrounding the dam site, many years ago.



Forested hills in Sunan county, Gansu

The upshot is that it seems reasonable to question the baseline scenario against which environmental impacts are measured. Were serious efforts made to restore the natural environment in the region, the dam may indeed be judged to have greater impacts on habitats, vegetation and aquatic life.

In order to increase the height from which water falls (thereby generating more power), Xiaogushan diverts a portion of the river through a 9 km tunnel to the dam's power station. At certain times of the year (parts of November, for example), the riverbed is dry in the area immediately behind the dam.



Dry riverbed in area immediately behind dam

Social and community impacts

The dam is located in a region of Sunan county primarily inhabited by herders belonging to the Tibetan minority group. Livestock is the primary source of livelihood, and the area is sparsely populated compared to most agricultural regions in China. Interviews with villagers in Bajiaowan, the village located closest to the hydropower station, indicate that many households were informed of the dam before it was built; villagers said that representatives of the hydropower company had made visits to their homes to inform them of the “benefits” of dam construction. (Whether these meetings strictly meet the definition of “prior and informed consent,” it is difficult to say: Residents were presented with information. As there’s little precedent for government or businesses asking for citizens’ “consent” in China, this concept was confusing to interview subjects – determining whether they had simply listened or actively consented.) Also, as there are only about 70 households in Bajiaowan village, informing the community was a more limited task than in scenarios where dams impact thousands.

Residents in both Bajiaowan village and nearby Xishui township said that the hydropower company had made investments in the local community that they judged beneficial: in particular, they mentioned tuition grants to some pupils at a local primary school and improved transportation from their village to the regional commercial hub, Zhangye City. (Residents in Bajiaowan said that previously there had only been a bus traveling this route every other day; now a bus leaves two times each day.)

They did have some complaints. One woman in Xishui, who raises livestock and grows crops, said that the road to the dam had not been properly paved. Increased vehicle traffic churned up a lot of dust, which was problematic for her crop fields (broad beans, linseed, and potatoes) and sheep.

Residents in Xishui mostly reported that the cost of electricity had decreased since Xiaogushan was built. They said they did previously have electricity (in contrast to some inferences made in approval and validation reports); however, electricity was supplied by another dam and the price was higher. One man in Bajiaowan offered a different account and said he believed his electricity fees were now higher, and that he had been told he would pay a flat sum each year, but instead is charged on a metered basis.

When asked if they had been informed about the construction of other nearby dams on the Heihe river, or if they knew of investments those dams had made in the community (schools, roads, etc), all villagers said “no.” This fact is significant in several regards. In an ideal situation, of course, a system for international investment in Chinese dams would help augment local practices at large, especially if it freed up domestic capital to finance other dams.

Integrity of approval and validation process

The site visit revealed some inconsistencies with the Asian Development Bank's "recommendation for funding" report and the Japan Consulting Institute's "validation" report. According to figures in the ADB report, which were simply cited by the JCI report, the dam was expected to generate 3,000 jobs during the construction period. According to a representative from the hydropower company, about 600-700 jobs were generated during construction (approximately 70 of them filled by locals). The simple point is that numbers provided in funding applications cannot be taken for granted by project reviewers. In this instance, 600 jobs is *one-fifth* of the original number touted.

Another possible inconsistency is that the validation documents point to extensive consultation with the lama of Midi Temple, an important regional center of Tibetan Buddhism. A research visit was paid to Midi Temple on a very snowy day; there appeared to be little activity, but one lama was found carrying books to his home. He said that he had not heard of any consultation between the lama of the temple and the dam company. While he couldn't vouch for the experiences of all other lama, he did note that the temple community was relatively small, with only about 15 lama in residence.

C. Additional Images



Barren hills adjacent to Bajaowan village (above); road to dam site (below)





Tibetan flags against landscape (above); woman in Xishui township (below)