

# Setback for Mexico's La Parota Dam

by Monti Aguirre

**“C**ancelada la Presa la Parota, estamos resueltos a ganar!” (“La Parota Dam has been canceled, we are determined to win!”) shouted a line of people who would be affected by the proposed dam as they marched along the main tourist avenue in Acapulco in August.

If built, the project would affect the lives of 25,000 people who currently depend on the Papagayo River for fish, transportation, agriculture, water and other uses.

For more than four years, peasant communities have been relentless in their opposition to the dam. First, they blockaded dam builder CFE from entering their towns, and drew national attention to their struggle. Then, villagers found that in the rush to obtain project approval, CFE's consultation process was flawed, so they resorted to seeking legal action in local and federal tribunals. The consultation is required for CFE to obtain the license to build the project.

A legal action filed before the federal courts resulted in the provisional halting of the project. A judge's order, issued in August,

protects communities' constitutional rights to a healthy environment and the right to consultation; the project was halted on the grounds that several government agencies violated those rights in the process of seeking project approval.

“This action sets an extremely important precedent. It is rare that protecting the environment and peasant communities would supersede the economic interests to build an infrastructure project of this magnitude,” said Gustavo Castro from the Mexican Movement of Peoples Affected by Dams and in Defense of Rivers.

But the fight of villagers to stop the dam is not over. Lawyers expect the government to appeal, which could take more than seven months to reach a final resolution. It is still to be seen if either the project's environmental license or its water concession (which allows CFE to build a dam on the Papagayo River) will be revoked. The loss of the water license is more likely to put a final halt to the 900 MW project, which is

designed to supply electricity to the national grid and water for Acapulco.

## Work continues

Meanwhile, CFE keeps on working in the project area. Mexican construction company ICA – owned by magnate Carlos Slim – has demonstrated strong interest in building and financing the US\$1 billion dam.

Not letting their guard down, villagers said they will continue the road blockades preventing project proponents from coming through their villages. Community leader Felipe Flores said, “A project cannot be imposed with blood and fire when people do not want it.”

Villagers also question promises made by the company. “They said that they were going to build houses for affected peoples, but where? All the land in Guerrero State has owners, and the state never set land aside for problems like this,” said Flores. ■

*For more information on the legal campaign to stop La Parota, see WRR, Feb. 2007.*

## China's Global Reach

## IN THIS ISSUE

- Overview:** China's economic expansion is adding pressure on the world's rivers. **Page 1**
- Commentary:** The Three Gorges Dam is suffering serious problems. Is China learning the lessons of its own dam projects for its global ventures? **Page 2**
- Nepal:** The West Seti Dam may benefit China and India, but not most Nepalis. **Page 3**
- Latin America:** Amazon dams move forward, while role in damming the region's rivers is complex and problematic. **Page 4**
- Southeast Asia:** China's proposed dams in Patagonia get green-washing. **Pages 12-13**
- Solutions:** A primer on dam-free hydropower. **Page 10**
- Map:** A look at the world's dams that are "made by China." **Page 8**
- Mozambique:** Local activists wonder if China is a new colonial power, with its destructive logging and damming activities there. **Page 6**

Change Service Requested

1847 Berkeley Way  
Berkeley, CA 94703, U.S.A.

International Rivers Network



Non-Profit Org.  
US POSTAGE  
PAID  
Berkeley, CA 94703  
Permit No. 126

# World Rivers Review

Volume 22, Number 3 / September 2007

Published by International Rivers Network

## China Triggers New Global Dam Boom

### *Country's Economic Expansion Adds to Pressure on World's Rivers*

by Peter Bosshard

**O**n August 27, Miloon Kothari, the UN Special Rapporteur on Housing Rights, sounded an alarm on human rights abuses over Sudan's Merowe and Kajbar dam projects. "I have received numerous reports of violations of civil and political rights," Kothari warned. The violations included "the shooting of unarmed demonstrators, arbitrary arrests of activists, and repressive measures against the press." The UN Rapporteur called on all actors involved in Merowe and Kajbar to suspend project activities until the human rights situation had been assessed.

More than 50,000 people are currently being displaced from the Nile Valley to the Nubian Desert by the Merowe Dam. In the late 1990s, a Sudanese delegation visited Europe and Canada in search of funding for the dam – in vain. Traditional financiers shied away from the disastrous project. The Merowe Dam went ahead when Chinese and Arab institutions agreed to finance it. With loans of US\$520 million, China Exim Bank is its main funder. As Miloon Kothari pointed out, the project's "forced evictions violate a wide range of human rights."

The Kajbar Dam will submerge approximately 90 villages in Sudan's Nubian North – a region that was badly affected by the Aswan High Dam. When villagers protested against the project, the security forces shot and killed four people. The Sudanese government has also detained several journalists and academics and evicted foreign diplomats because of their interest in the project.

### **New era of global dam building**

The ruthlessness with which the Merowe and Kajbar dams are being built is exceptional. Yet China's involvement in large foreign dams is



*Affected villagers protest the Kajbar Dam, proposed for Northern Sudan. China may get involved.*

not. The map on page 8 presents 47 recent dam projects around the world that have Chinese involvement; more are being planned.

When the Merowe Dam was being planned 10 years ago, the global dam industry was in crisis. The rate of new dams slumped from more than 5,400 in the 1970s to just over 2,000 in the 1990s. The World Bank had mostly withdrawn from financing such structures. And China was not yet able to build large dams on its own.

When China built the massive Three Gorges Dam, it forced the project's Western exporters to manufacture some of their equipment in China, and transfer their technology to local partners. Once Chinese companies had acquired this know-how, they wasted no time in taking up projects in other countries. They conquered the global

dam building market, and China Exim Bank has now become the world's primary financier of such projects. Unlike many Western funders, the Chinese export credit agency does not require borrowers to liberalize their economies to qualify for its loans.

Building dams in Africa, Southeast Asia and other parts of the world allows Chinese companies to escape the stiff competition at home. The government supports their exports in order to create jobs in China, and to strengthen friendly relations with other governments. Many projects, including the Merowe Dam, also help power Chinese overseas investments, such as mines, oil exploration, and manufacturing plants.

China is building many dams that ignore the lessons of the past and should not go

*continued on page 15*

# A New "China Syndrome"

China is home to thousands of dams, including what is probably the world's most notorious, the Three Gorges Dam. This project's gigantism is the root of some of its worst problems. The massive project set records for number of people displaced (at least one million), number of cities and towns drowned (13 cities, 140 towns, 1,350 villages), and length of reservoir (more than 400 miles). Now, its record-breaking environmental impacts are beginning to fester. The *Wall Street Journal* reports, "a year after completion, the project has new problems -- including landslides, water pollution and suggestions that the dam could contribute to the very flooding it was built to prevent." A top official said, "the problems are all more serious than we expected."

In an article on August 29, the *Journal* reported that the massive weight of water behind the dam is eroding the Yangtze River's shores, causing deadly landslides. The reservoir is polluted from raw sewage runoff and the submergence of so much industrialized land. By stopping silt from moving downstream, the dam has dramatically altered the river's estuary and fisheries it supports. Sea water is now coming further inland. Because the silt-free waters downstream of the dam flow faster now, flood control structures have been damaged.

Three Gorges is not alone in its litany of seemingly intractable problems -- problems that have the potential to outweigh its benefits. According to the official Xinhua news agency, more than one-third of China's 85,000 or so reservoirs have "serious" structural problems. A deputy minister of water resources recently called China's reservoirs "time bombs" that threaten the lives and property of those downstream, the *Journal* reports. In addition, China's dams and diversions have so depleted many major rivers that they have either become slow-moving cesspools or dry up for part of their course, adding to a nationwide water crisis that will only worsen with global warming.

Chinese officials aren't talking about the troubling record of large dams with their own citizens, much less with foreign governments to whom they are selling their dam-building experience and services. As this issue reveals, China is today building dams in dozens of countries around the world, many of which have poor or nonexistent environmental and social protections for such projects, and in some cases, no political space to speak out nor a free press to keep an eye on problem projects. Chinese firms and lending agencies are involved in projects that could result in further human rights abuses in countries such as Sudan and Burma, and do serious harm to rivers such as the Mekong and the Zambezi. The cumulative social and environmental impacts of its worldwide dam-building boom could outweigh the benefits these projects are intended to bring.

While China's internal standards for environmental assessment, access to information and resettlement have been improving in recent years, the nation's dam-builders may not feel compelled to adhere to these standards on dam projects elsewhere. China is not alone -- northern dam-building nations have set aside their own high standards for mitigation, public disclosure and environmental analysis when it comes to building dams in the global south.

As China continues to reach out to poor nations with development assistance, its global record on large dams could grow into a public relations disaster that threatens its reputation and the good will it has built in many places. To help repair the damage, China (and other dam-building nations exporting their expertise) must step back from the worst projects, and take steps to ensure that those dams which are built are not doing more harm than good. China also has an obligation to protect human rights and the environment under many international conventions which it has signed and ratified.

China can offer expertise and services that could better meet the needs of poor societies than large dams. China's central planning is well-suited to assisting national agencies with comprehensive needs and options assessments, improving cumulative-impacts analysis for rivers with multiple dams, and finding ways to improve the efficiency of existing dams before building new ones. Its success in building poverty-busting microhydro projects, biogas digesters, clean stoves and rainwater harvesting structures could be a better fit for the problems found in many of the places where large dams are being prioritized. Starting with these steps, China could become a true partner in solving some of the world's most intractable problems.

Lori Pottinger

## World Rivers Review

Volume 22, Number 3

ISSN Number 0890 6211

Editor: Lori Pottinger

Design/Production:  
Jeanette Madden

Printing:  
Hunza Graphics

### IRN

Executive Director:  
Patrick McCully

### Staff:

Monti Aguirre, Karolo Aparicio, Peter Bosshard, Nicole Brewer, Elizabeth Brink, Riam Firouz, Jamie Greenblatt, Terri Hathaway, Inanna Hazel, Aviva Imhof, Tim Kingston, Shannon Lawrence, Aaron Levy, Carl Middleton, Lori Pottinger, Elizabeth Sabel, Aaron Sanger, Ann-Kathrin Schneider, Glenn Switkes

Interns & Volunteers:  
Selma Barros de Oliveira,  
Wil Dvorak

### Board of Directors:

Martha Belcher (*Chair*), André Carothers, Bob Hass, Marcia McNally, Milan Momirov, Deborah Moore, David Pellow, Lori Udall, Meeta Vyas

### Advisory Board

Dan Beard, Patricia Chang, Peter Coyote, Chris Desser, Huey D. Johnson, Dorka Keehn, Lauren Klein, Juliette Majot, Nion McEvoy, Sylvia McLaughlin, Mutombo Mpanya, Mayumi Oda, Drummond Pike, Gary Snyder, Lara Truppelli

### Contact IRN:

1847 Berkeley Way  
Berkeley, CA 94703 USA  
Tel: (510) 848-1155  
Fax: (510) 848-1008  
E-mail: [irn@irn.org](mailto:irn@irn.org)



Printed on Re:Vision  
10% tree free kenaf/  
90% recycled pcw

Visit IRN's Website:  
<http://www.irn.org>

*WRR is indexed in the Alternative Press Index.*

# China Set to Finance Controversial Nepal Dam

by Yuki Tanabe

**I**t has been 12 years since the World Bank dropped its support for the massive and costly Arun III Hydroelectric Project in Nepal in response to local and international criticism. Today, Indian companies are bidding to construct Arun III and the Asian Development Bank and Chinese financial institutions are considering financing an even larger dam project on the Seti River in western Nepal that, like the ill-fated Arun project, brings few benefits to local people and exports all the power to India.

The US\$1.2 billion West Seti Hydroelectric project is being planned and built by the Australian Snowy Mountain Engineering Corporation (SMEC), funded by Chinese banks, and its electricity transferred to India. Nepal will receive just 10% of the project's revenues in exchange for displacing more than 12,000 farmers (the most for any hydropower dam in Nepal) and bearing the project's environmental destruction.

The West Seti project is symptomatic of the current trend in hydropower development in Nepal. China and India are calling the shots: they provide the money and they import the generated electricity. In July, a Chinese government delegation visited Nepal and announced its willingness to invest in the nation's hydropower sector. The Chinese delegation immediately offered loans for the 60MW Upper Trishuli hydropower project in

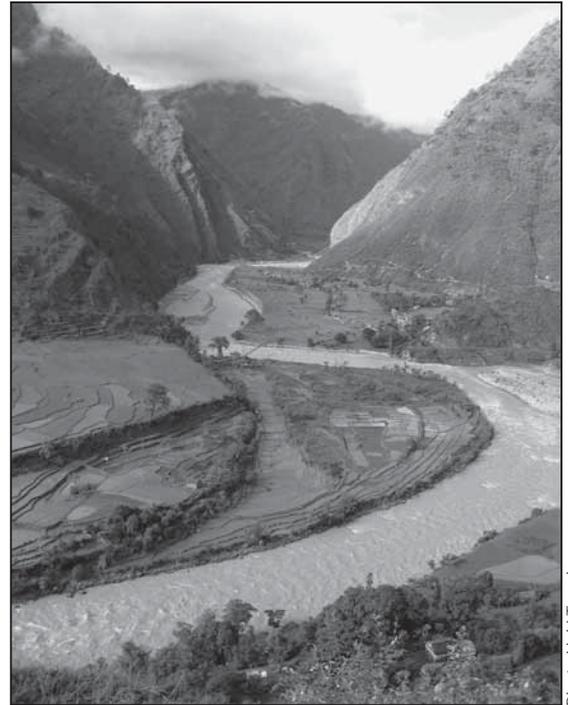
Nuwakot district. In April, Nepalese newspapers announced that it was very likely that Indian companies would get the contracts for the 400 MW Arun III and the 300 MW Upper Karnali projects.

## Leaving local people out

When I visited the affected area in July, many affected people expressed concerns regarding the West Seti project. Local people are worried about their upcoming losses and are unsure how the company will resolve them. The project's resettlement plan is yet to be disclosed to the local community, despite the fact that the company says it intends to begin construction as early as November. The West Seti Concern Group, a committee of affected people, has written to Haruhiko Kuroda, the President of the Asian Development Bank, requesting the ADB reconsider its financing for the project.

According to the Environmental Impact Assessment (EIA), four public hearings and many informal meetings with local people were held during project preparation. However, there has been no public hearing in the submerged area, and the public hearings participants' list reveal that most participants came from non-submerged areas. In addition to the public hearings, there have been many informal meetings, but these did not provide opportunities for affected people to raise their concerns or participate meaningfully. People also told me that the only information disseminated by the company was short information sheets, and that SMEC rejected a request to make detailed information on the project's environmental issues available. In fact, when I visited the affected area, nobody had seen drafts of the EIA or the resettlement plan.

According to the EIA, more than 12,000 people will be displaced to Terai in southern Nepal. Terai is significantly less rich in natural resources than the submerged area, and livelihoods in the area where the resettlement sites will be built are significantly different from those in the submerged area. On my field trip, I walked in a mountain area for five days, and found many types of natural products being used by local people. Affected people are likely to lose many natural products such as edible wild plants and fruits, and



*The Seti River near the dam site.*

Photo: Yuki Tanabe

will find it difficult to maintain their livelihoods. Moreover, resettlement lands in Terai are widely dispersed, resulting in the existing communities being broken up geographically.

One old man from the area to be submerged told me, "I don't want to move. The company will give us some money for compensation, but they won't give us a place with nature and climate like here."

The West Seti project is just the first of a flood of proposed hydropower projects for exporting Nepal's "water wealth" to neighboring countries. The Nepali government earlier this year opened bids for the Arun III, the Upper Karnali and the Budhi Gandaki large dam projects, and happily announced that it had received interest in these projects from both India and China. The policy of reducing the barriers to private-sector investment in the energy sector is not geared toward increasing modern energy services in Nepal, where just a third of the population has electricity in their homes. While Delhi and Beijing are starting to exploit Nepalese water resources to feed their power-hungry industries and megacities, millions of Nepalese will continue to cook their meals over a smoky three-stone fire in poorly lit and ventilated kitchens, spending an hour or more each day collecting firewood. ■

*The author is with Japan Center for a Sustainable Environment and Society (JACSES).*

## Fast Facts on West Seti Dam

**Cost:** US\$1.2 billion

**Potential power production:** 750 megawatts. All electricity produced will be transmitted to India. Nepal will get 10% of project revenue.

**Funders:** The project is expected to receive loans and guarantees from Asian Development Bank, the US Multilateral Investment Guarantee Agency (MIGA), India's Infrastructure Leasing and Export Corporation, China Export and Import Bank, Bank of China, Industrial Bank of China, China Export and Credit Insurance Corporation.

**Status:** Construction could start as early as November 2007, according to SMEC, and be completed by 2012.

# Building Friendships, Building Dams

## *China's Charm Offensive in Southeast Asia Bodes Ill for Mekong Basin Rivers*

by Carl Middleton

**K**ampot province in Southern Cambodia is a sleepy coastal region most renowned for its fresh pepper, salt production, and durian fruit. The Kamchay River weaves its way across the land, from the highlands of Bokor National Park southward through a fertile valley of durian orchards and rice fields before arriving in the provincial capital, Kampot Town, where the steep-sided plateau of the national park dominates the skyline. Rich in natural wealth, the national park is also a popular tourist destination, especially the rapids and pools at Touk Chuu on the Kamchay, where families play in the cool, clean water and vendors from nearby villages serve freshly prepared local delicacies.

This tranquil corner of Cambodia is soon to be transformed into the country's new powerhouse. Several kilometers upstream of Touk Chuu, deeper within the national park, Chinese engineers are busy finalizing surveys that will clear the way for construction later this year of Cambodia's first large hydropower scheme, the 193-megawatt Kamchay Dam.

The 110-meter-high dam's reservoir will flood 2,000 hectares of forest, or two percent of the national park's area. According to a 2002 survey, this protected forest is the habitat of 31 mammals and 10 endangered species, including Asian elephants, leopard cats, and tigers. The Cambodian government has decided it is willing to sacrifice the forest in order to secure desperately needed power, a constraint on economic growth where electricity prices are among the highest in the world.

This is not the first time that the Kamchay Dam has been considered for development. In the early 1990s the Canadian International Development Agency (CIDA), strongly encouraged by the Cambodian government, investigated the feasibility of the dam. CIDA concluded the project was economically feasible, but withdrew its support following heavy pressure from a coalition of Cambodian and international NGOs concerned about the project's poor social and environmental standards.

The project lay dormant for almost a decade. Then, in 2005, to much fanfare, Chinese Premier Wen Jiabao and Cambodia's Prime Minister Hun Sen presided over an agreement that approved Sinohydro Corporation, China's largest hydropower developer, to step in and develop Kamchay Dam. High-level Cambodian and Chinese government officials



Photo: Carl Middleton

*Tourism at the Touk Chuu rapids in Cambodia could be impacted by the proposed Kamchay Dam.*

had pushed forward the Kamchay Dam's revival in closed-door negotiations that largely left other stakeholders, including the local authorities and the public, out of the process.

Using a US\$280 million concessional loan from China to Sinohydro, the company will build, own and operate the Kamchay Dam for 44 years, before transferring the project (quite late in its expected lifespan) to the Cambodian government in 2050. Opposition politicians have questioned the length of the contract, which are typically 25-30 years in length. They have also questioned a July 2006 vote by Cambodia's National Assembly to guarantee Sinohydro financial compensation if the project faces difficulties or underperforms. Leaders of the ruling party justified the guarantee by claiming that it was necessary to secure Sinohydro's investment. One abstaining opposition lawmaker, H.E. Keo Remy, pointed out that the Sinohydro contract had not been revealed to the lawmakers by the time of the vote.

Villagers in Mak Prang commune living downstream of the dam site along the Kamchay River remain blissfully unaware of the project's potential implications for their lives. Those living closest to the dam, who have witnessed the arrival of excavators

and other heavy construction equipment from China, say their main concern is that "the dam will collapse." Poor river water quality, however, is a more real threat, and could devastate the local tourism industry, pollute irrigation water that feeds the abundant durian and rice fields, and contaminate Kampot Town's water supply, extracted just downstream of the planned dam site.

While the project's location within a national park means there is almost no resettlement, there will be a large number of people affected by the impoundment of the reservoir. According to the local commune chief, the poorest 30% of villagers in Mak Prang commune depend on the collection of forest products such as bamboo, rattan, and malva nuts from the proposed reservoir area to supplement their income. Neither the company nor the government have yet to develop concrete plans to replace their livelihoods, with some local government officials suggesting the new dam will bring new industries to Kampot and generate employment. Realistically, the electricity will more likely feed industrial growth in Cambodia's capital, Phnom Penh, or in a planned export development zone close to Cambodia's only major deep-water port, Sihanoukville.

*continued opposite*

In many ways, the Kamchay Dam is a microcosm of the complex process through which political, economic and social relationships are being fostered between China and its downstream neighbors located along the Mekong River that threads the countries together. Especially in Cambodia, Burma and Laos, China is willing to support controversial infrastructure projects as part of its diplomacy agenda. These governments warmly welcome the investments.

### A growing relationship

Political ties between Cambodia and China have warmed considerably in recent years, smoothing the way for increased economic interdependence and trade. In an interplay of politically motivated “development aid” and profit-driven entrepreneurial spirit, Chinese State Owned Enterprises (SOEs) have committed to investing in a number of high-profile infrastructure projects including hydropower dams, bridges, and highways. The projects are often backed by Chinese government-supported “Policy Banks,” such as the China Export-Import Bank.

While Cambodia’s traditional Western donors, together with the World Bank and Asian Development Bank, have been hesitant to support the government’s ambitious yet contentious hydropower development strategy, the Chinese government has proven willing to provide both technical expertise and financial backing. The Cambodian government approved a second major hydropower project in early 2007 and four more are known to be presently undergoing detailed feasibility studies.

Signaling the countries’ strengthening relationship, in April 2006, China’s Premier Wen Jiabao announced a package of \$600 million in loans and grant aid to Cambodia during high-level talks with Cambodia’s Prime Minister Hun Sen, which included the financial backing for the Kamchay Dam project. Hun Sen thanked Wen Jiabao for the “no strings attached” loan, commending China for not interfering in the internal affairs of Cambodia. The Chinese aid package, which will be disbursed over a three to four year period, is marginally less than the amount pledged to Cambodia by all Western donors combined for 2006.

Cambodia is not alone in receiving special attention from China in mainland Southeast Asia. Burma and Laos have also been the recipients of major aid packages,

---

## *China is supporting controversial dams in Cambodia, Burma and Laos as part of its diplomacy agenda.*

---

infrastructure investments, and, to varying extents, military cooperation (mainly to strengthen domestic security forces). They have welcomed China’s policy of non-interference in its provision of aid, which is disassociated from human rights and good governance conditionalities. Strengthened political relationships with China benefit Burma, Cambodia and Laos on the global stage too, as China proves willing to block or dilute international actions that harm these weaker countries’ interests, as well as to moderate pressure from the region’s more powerful players, namely Thailand and Vietnam.

In return, China expects little. Burma, Cambodia and Laos have publicly announced their support for the “One China” policy (which does not acknowledge Taiwan’s sovereignty) and recognize China’s interests, mostly trade related, which China reciprocates, in principle, on an equal footing.

In addition to increased opportunity for trade and investment, China reasons that stimulating economic growth will reduce the risk of state failure and, therefore, potential security threats at its borders. China is also especially interested in countering US and Western influence on its doorstep, an interest generally shared by Cambodia, Burma and Laos. These warmer friendships are, of course, also strategic alliances and open up opportunities within the region to China, including trade routes and access to natural resources. For example, Burma, offers overland access to the Andaman Sea, considered vital for both trade and diversifying China’s routes for oil imports from the Middle East and Africa. China’s oil imports currently arrive via tankers that must navigate the Straits of Malacca – a pirate-infested region that could also act as a potential choke point in the case of conflict.

China’s policies toward Southeast Asia have encouraged not only major SOEs to invest in mainland Southeast Asia, but also Chinese traders and workers to migrate to these countries to seek opportunity and profit. As the volume of trade has grown, economic interdependence has become

more entwined, thus consolidating China’s influence in the region.

In the eyes of the leaders of Burma, Cambodia and Laos, China provides an attractive alternative development model to that offered by the West, under which they need not cede decision-making or bend to western interests’ mandates. The realities of the environmental destruction and widening social inequity that accompany China’s development model are, at this point, largely unacknowledged by the region’s decision-makers.

Despite the significant benefits of partnering with China, the governments of Burma, Cambodia and Laos are hesitant to completely depend upon China’s guardianship for both historical and practical reasons. They have, therefore, continued to court other donors and powerful players to act as a counter-balance to China’s growing influence.

### China woos Laos

In July 2007, Laos celebrated the thirtieth anniversary of their Friendship and Cooperation Treaty with Vietnam, its traditional regional ally since resistance to French colonialism and, more recently, as Communist states sharing a common struggle. In reality, however, Laos is widely viewed as a Vietnamese client state. Yet the nature of the relationship is changing, according to Andrew Symon of *Asia Times Online*, who writes: “Economics and business, rather than the old fraternal bonds among aging Communist Party cadres, will be the ties that bind future bilateral relations.” Symon observes that, on the back of increasing regional integration, Vietnam must now compete with Thai, Chinese and Western investors for access to Laos’ rich natural resources, including its massive hydropower potential that is coveted for export to meet the growing energy demands of its regional neighbors.

In August 2007, Laos’ Prime Minister, Bouasone Bouphavanh, visited Beijing where he met with Chinese President Hu Jintao. Hu told Bouasone that China and Laos had huge potential to cooperate on key areas, such as trade, energy and infrastructure. Bouasone said, “Development of the bilateral relations not only serves the fundamental interests of the two peoples, but also helps maintain regional and world peace and prosperity.” Both Laos and China, although Communist states in name, have recently made moves towards adopting market economic principles.

Through China Exim, China has already financed the controversial 40 megawatt Nam Mang 3 Dam, located 80 kilometers northeast of the Laotian capital of Vientiane,

*continued on page 14*

# A New Colonial Power in Mozambique

## *China Exploits Zambezi River Ecosystems and Nation's Law Policies*

by Anabela Lemos and Daniel Ribeiro

“Cahora Bassa is ours” were the first words Mozambique’s president, Armando Guebuza, said after signing an agreement with Portugal’s prime minister to transfer ownership of the 27-year-old hydropower dam on the Zambezi. The last link to Mozambique’s colonization by Portugal is finally broken, but are Mozambique’s new economic ties following a similar pattern of exploitation and abuse?

Abusive economic interests are not something new in international relations, with extensive examples of the destabilizing and crippling affects they can have on developing countries. These negative experiences have given foreign donors like the World Bank a bad reputation, and forced a number of donors to take social and environmental impacts more seriously and develop policies to address transparency, social justice and environmental sustainability. Past experience has shown that such protections are vital requirements in the quest for truly sustainable development.

However, one of the new overseas investors, the giant China – now rivaling the World Bank for honors as the biggest lender to African nations – is undermining the lessons learned of the importance of transparency, social justice and environmental sustainability. China’s expanding demands for new energy and raw materials (as well as markets for its own goods) has made Africa a focus point for obtaining these valuable natural resources, and many of its nations are increasingly important economic partners. China is the biggest consumer of zinc, nickel, copper and crude oil and the top importer of tropical woods.

China’s weak social and environmental requirements, disregard for human rights protections, lack of transparency, and policy of non-interference in the internal affairs of the countries it lends to has resulted in some African governments being shored up with funds while allowing them to avoid local and international pressure to clean up corruption. The result has been dictators

maintaining power, centralizing wealth, and avoiding true development.

Mozambique is one of the African countries that has latched onto China’s funding approach and grabbed the opportunity of non-interference and weak policies with both hands. Below are some recent examples of the negative results of this relationship.

### Mphanda Nkuwa Dam

The proposed Mphanda Nkuwa dam is a good example of the problems linked to China’s lack of concern for human rights and the environmental impact of the projects it is financing. The US\$2.3 billion Mphanda Nkuwa dam proposal has caused considerable debate in Mozambique, with civil society and the potentially affected communities raising numerous concerns. The project’s weak social and environmental assessment; high economic, environmental, social and technical risks, and many other negative impacts have put Western funders such as the World Bank off the project. In spite of these problems, early this year the China Ex-Im Bank, China’s overseas lending arm, agreed to back the construction of the dam project.

The Mphanda Nkuwa Dam will have a capacity of 1,350 megawatts and will add to the woes of one of Africa’s most dammed rivers, the Zambezi. The dam’s electricity will be directed primarily towards industry and southern Africa’s regional grid, completely ignoring the fact that less than 5% of Mozambicans have access to electricity. The production of the power will cause twice daily fluctuations in the river’s flow, which will have adverse impacts on the people downstream who depend on the river for suitable and acceptable access to water, fishing, river navigation and flood-recession farming.

The dam will also undermine years of restoration work in the Zambezi delta – East Africa’s richest wetland and a Ramsar “wetland of international importance” site – which has been damaged by the mismanagement of the Cahora Bassa Dam, just over 70km upstream of Mphanda Nkuwa. A daily flow regime and flood simulation is being suggested for Cahora Bassa Dam to better support downstream ecology and meet environmental flow requirements. However,

the Mphanda Nkuwa Dam flow regime has been based on Cahora Bassa’s present destructive one, and the project environmental impact assessment states that if that is changed it could make Mphanda Nkuwa uneconomic. It is likely, therefore, that the years of work to begin restoring the Zambezi downstream of Cahora Bassa will be dropped in favor of getting more hydro-electricity out of the river.

The recent 7.5 earthquake and several aftershocks in Mozambique have justified already existing concerns about the seismic risk linked to the Mphanda Nkuwa project. The country is in the vicinity of the Nubia-Somalia plate boundary and straddles a highly active fault zone called the Shire trough, which runs southward from the southern point of Malawi almost all the way to Maputo. Thus the country is considered to be in a seismically active zone, but poor records in the area severely constrain scientists’ ability to determine the potential for large earthquakes. For example, the recent 7.5 earthquake was nearly 13 times bigger than had been thought possible along that fault.

The Mphanda Nkuwa Dam will be in this seismically active area, just 200km from the heart of the Shire trough fault zone. In addition, the shape of the Shire trough means that the dam’s reservoir could increase the surrounding plates’ seismic potential as a result of the increased weight of the water – a phenomenon known as “reservoir-induced seismicity” or RIS. Furthermore, the Estima fault crosses the reservoir 25 meters from the proposed dam wall. It is thought that this fault is active despite there being no activity in the recent geologic record. Mozambique’s lack of experience with and knowledge of large dams and China’s low social and environmental requirements, coupled with the weak data available for the area, increases the risk and creates the potential for a major disaster.

The China Ex-Im Bank’s funding is intended to promote the export of Chinese mechanical and electronic products and high- and new-tech products, to support Chinese companies with comparative advantages, to “go global” with offshore construction contracts and overseas investment projects. The bank’s involvement in Mphanda Nkuwa has removed the

China’s Global Reach



*These children live along the Zambezi River below the site of Mphanda Nkuwa Dam.*

pressure on the Mozambique government to improve the social and environmental assessments of this project and has enabled the government to avoid addressing its various negative impacts. If the dam project goes ahead in its present form, it will be another example of the negative impacts of large dams and will significantly handicap Mozambique's development.

Other Chinese dam projects in Africa have not set an encouraging precedent. There have been serious human rights abuses around the Merowe Dam in Sudan, for example. Its resettlement program has been very poor, there has been no transparency, and it has a bad record on environmental and social assessment.

Closer to home, in Zambia, state utility ZESCO is working with the Chinese company Sinohydro on the Lower Kafue Gorge project. It chose a dam site after a balanced assessment of the economic, social and environmental factors. However, we have learned from an inside source that Sinohydro told ZESCO that it was not how they did things in China and that they wanted to see a site assessment that focused only on economic factors. In the end, the original ZESCO site was selected, but the role of the Chinese dam builders in trying to focus only on the economics of the project does not bode well.

### Logging in Zambezia Province

Chinese timber buyers are colluding with Mozambican business people and some

members of the Mozambique government forest services to strip precious slow-growing tropical hardwoods from Mozambique's semi-arid forests at a rate that could see the resource exhausted in five to ten years, according to reports of the trade on timber and wood in the Zambezi. The unsustainable logging begins with Chinese support to timber buyers to acquire "simple licenses," which allow logging of a relatively small quantity in a specific area. These licenses are given to local Mozambicans (146 in 2003 alone), thus starting a deforestation process often referred to as "the Chinese takeaway."

Under-reporting of logs taken is systematic and widespread. Inspections are rare, bribes common, and the computer-based control system of licensing and transport is purely cosmetic, according to reports and local experts. There is only one real checkpoint, where copies of all the licenses of all the operators are filed and where all drivers should stop. Here, the focus is on villagers with small volumes of hand-sawn timber and established industrial operators, while operators well-connected to politicians and the timber buyers are allowed to escape. In 2002, the quota was set at 42,000m<sup>3</sup> but the local government agency responsible for logging reported only 33,200m<sup>3</sup>, of which only 28,400m<sup>3</sup> was exported. However, that year 17 bulk carriers and 27 container ships loaded logs in the port, totaling 51,000m<sup>3</sup> based on the port authorities' record (also believed to be an underestimate by local experts).

The manipulation does not stop with the statistics and data, but also involves the regulations. Originally, the main commercial species had to be processed prior to export. However, just as the regulations were coming into force, the ministry, under pressure from the logging industry, passed a special regulation, reclassifying the commercial timbers to permit their export as logs. Now the unprocessed logs are exported to China, undermining local industry and transferring most of the benefits from one of the poorest countries in the world to what is becoming one of the most economically powerful. What is happening in Zambezia Province is replicated or even worse in other provinces. Rather than combating illegal logging, China – through measures including the manipulation of forest regulations, false technical information and statistics, bribes and indirect involvement in logging – is actually facilitating illegal logging and hindering sustainable development in the sector.

We also hear allegations from the coastal fishing communities of illegal fishing from Chinese boats, using longlines and gill nets that not only capture turtles and sharks but are also destroying our coastal zone. It was reported that in October 2005 a Chinese ship docked in Maputo harbor with around four tons of illegal shark fins. The Chinese illegal fishing boats are taking advantage of our government's lack of interest in or means to control and monitor our coastal area, and are destroying it and the livelihoods of the local communities.

The economic link with China is still a young and growing partnership with numerous investments in the pipeline. The few current investments have shown a tendency towards exploitation and abuse. The secrecy of the negotiations, the conditions of the funding and the disregard of the basic building blocks of development such as equality, social justice, a healthy environment and equity make us wonder if we Mozambicans are taking ownership of our country or just changing owners. What are the costs to our people and land? What will be the heritage of future generations? What is ahead of us? After so many years of being colonized by the Portuguese, are we now being colonized again, in the name of development but under the new flag of economic partnerships with China? ■

*The authors are with the Mozambican environmental group JA! (Justiça Ambiental). This article originally appeared in the book African Perspectives on China in Africa (Fahamu, 2007, [www.fahamu.org](http://www.fahamu.org))*

# Made by China: Damming the World's Rivers

by Nicole Brewer

In the past decade, Chinese companies and banks have greatly expanded their involvement in building and financing dams overseas. The cumulative social and environmental impacts of these projects will be huge. Here we show just some of the proposed and ongoing dams that have Chinese involvement.

## ALBANIA

1 Bushat Hydropower Station (40 MW).

## BELIZE

2 Chalillo Dam, Macal River. Complete.

## BRAZIL

3 Madeira River Dams. See story on p.12.

## BURMA

4 Yeywa project (790 MW). Under construction.  
5 Hatgyi dam, Salween River (13,000 MW with Tasang and Upper Thanlwin).

6 Tasang Dam, Salween River.  
7 Myitsone Dam and eight others (11,760 MW).

## CAMBODIA

The following 6 dams are all marked 8

- Sambor project, Mekong mainstream
- Kamchay Dam, (193 MW), Kamchay River
- Stung Atai Dam (140 MW). Atai River
- Lower Stung Russey Hydropower dam (107 MW). Russey Chrum River

- Stung Cheay Areng Dam (260 MW), precise location unknown
- Stung Tatay Dam, (80 MW). Precise location unknown

If built, the Grand Inga project (DRC) would divert the Congo River to produce an estimated 39,000 MW, and become the world's largest hydropower project. The project's impacts have not been studied, but one thing is clear – the \$80 billion project will be prone to corruption, and is too costly for meeting most Africans' needs for electricity. Instead, the power would be used for large industrial developments, and exported to southern Africa and as far away as Europe.

## DEMOCRATIC REPUBLIC OF CONGO (DRC)

9 Grand Inga, Congo River (39,000 MW for three dams).

## ECUADOR

10 El Reventador Dam, Reventador River (520 MW).

## ETHIOPIA

11 Tekeze Dam, Tekeze River (300MW).  
12 Neshi Dam, Neshi River (100 MW).

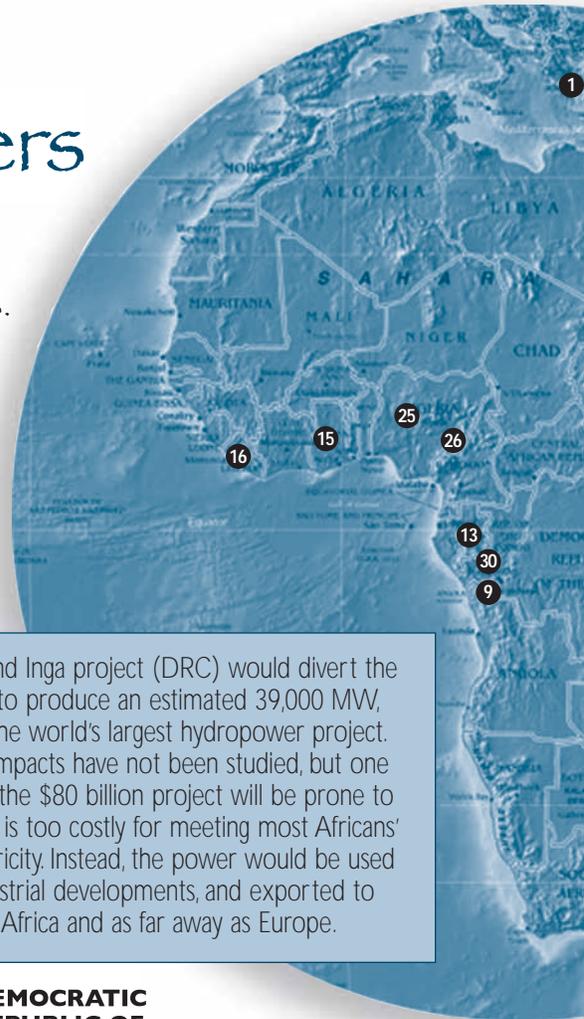
## GABON

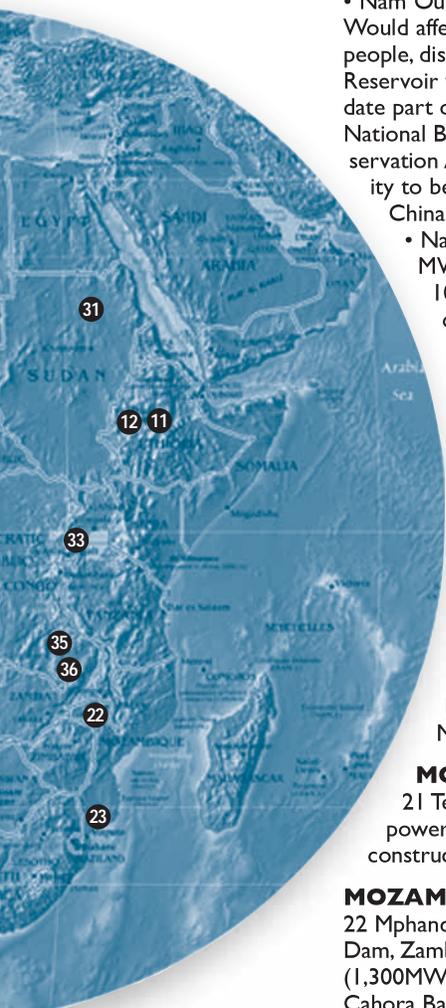
13 Grand Poubara Power Station, Ogooue River (160 MW)

## GEORGIA

14 Khadori Dam (700 MW).

The Madeira River (Brazil) is one of the principal tributaries of the Amazon and a treasure trove of biodiversity. The Madeira rainforest is also home to rubber tappers, Brazil nut gatherers, and fishermen. Two proposed dams – the Antonio and the Jirau – have received bids from the China International Trust and Investment Company.





- **Nam Ou 8 (640 MW).** Would affect some 50,000 people, displacing 7,000. Reservoir would inundate part of Phou Dendin National Biodiversity Conservation Area. Electricity to be exported to China.

- **Nam Tha (263 MW).** Estimated 10,000 people could be resettled if built at full size.
- **Nam Khan 2 and Nam Khan 3 (130 MW, 95MW).**
- **Nam Beng (50MW).** Paklay dam (Mekong mainstream).

**MALAYSIA**  
20 Bakun Dam, Balui River (2400 MW).

**MONGOLIA**  
21 Tesiya Hydro-power Project. Under construction.

**MOZAMBIQUE**  
22 Mphanda Nkuwa Dam, Zambezi River (1,300MW). Upstream Cahora Bassa and Kariba dams have left the Zambezi Delta damaged and local people struggling. Work now underway to restore the lower Zambezi by improving existing dam flows could be derailed by this \$2 billion project.

23 Moamba Major Project, Incomati River.

**NEPAL**  
24 West Seti Dam, West Seti River (750 MW). See story, page 5.

**GHANA**  
15 Bui Dam, Black Volta River (400 MW). The proposed dam would flood part of a national park and hippo habitat.

**GUINEA**  
16 Souapiti Dam, Konkoure River (750 MW). Financing for dam linked with \$9.2 million in aid and mineral development rights.

**INDONESIA**  
17 Jatigede Dam Project, Cimanuk River.

**IRAN**  
18 Taleghan Dam.

**LAOS**  
*The following 8 dams are all marked 19*

- **Nam Mang 3 (40 MW).** Commissioned in 2004
- **Nam Ngum 5, Nam Ngum basin (165 MW)**
- **Nam Lik 1.2 (100 MW).**
- **Xeset II project (70 MW).** Will be completed in 2009

**NIGERIA**  
25 Mambila Dam, Benue River (2,600 MW). Would be largest dam in Africa constructed by Chinese companies.

26 Zungeru Dam, Kaduna River (950 MW).

**PAKISTAN**  
27 Khan Khwar Dam, on main tributary of Indian River.

28 Dubowa Dam.

29 Mangla Dam, Jhelum River (adding 10 meters to 110 meter high dam).

**REPUBLIC OF CONGO**  
30 Imboulou Dam, Lefini River (120 MW)

**SUDAN**  
31 Merowe Dam, Nile River (1,250 MW). Under construction. Human rights violations of dam-affected communities, disregard

for cultural sites and antiquities. At least 50,000 people being displaced from Nile Valley to harsh desert lands.

**TAJIKISTAN**  
32 Zarafshon (Yovon) Dam (150 MW)

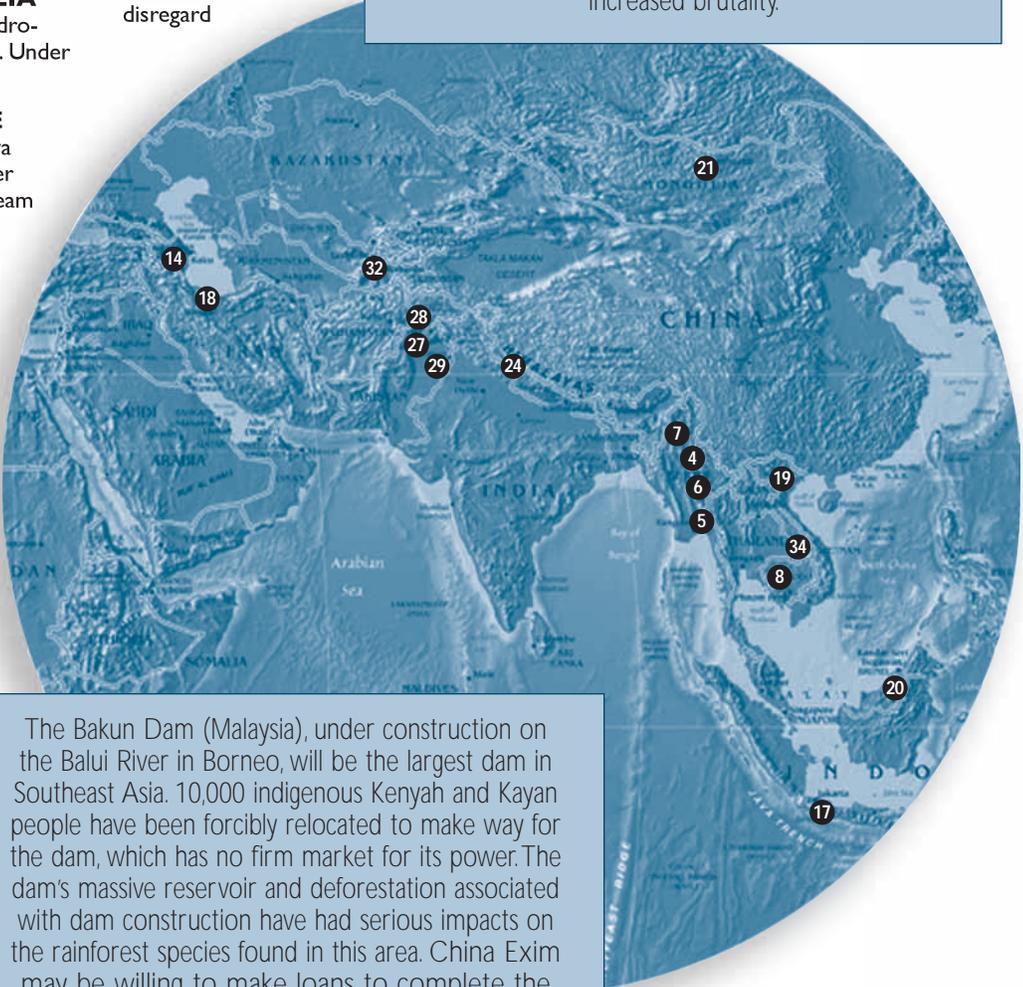
**UGANDA**  
33 Ayago Dams, Nile River (530 MW). China has expressed interest. Would flood Murchison Falls, part of a national park.

**VIETNAM**  
34 Se San Water Power Station No 1, Se San River.

**ZAMBIA**  
35 Lower Kafue Gorge Dam, Kafue River (750 MW)

36 Kariba North Bank (extension), Zambezi River

Burma's Tasang Dam is one of the largest dams that Chinese companies are helping to build in Burma. The dam will be built on the Salween River – the last large free-flowing river in Southeast Asia. It will not only displace several villages and disrupt fisheries, which are the foundation of local livelihoods, but will also result in increased military presence in the area, which for local communities means they will be subject to increased brutality.



The Bakun Dam (Malaysia), under construction on the Balui River in Borneo, will be the largest dam in Southeast Asia. 10,000 indigenous Kenyah and Kayan people have been forcibly relocated to make way for the dam, which has no firm market for its power. The dam's massive reservoir and deforestation associated with dam construction have had serious impacts on the rainforest species found in this area. China Exim may be willing to make loans to complete the project in order to secure energy for smelters China will build in Malaysia.

# Tide Turns on Unconventional Hydropower

## *Dam-free Hydro Taps Power of Waves, Tides, Water Pipes*

by Carrie Dolwick

*The sea heaves up,  
hangs loaded o'er the land,  
Breaks there, and buries its  
tumultuous strength.*

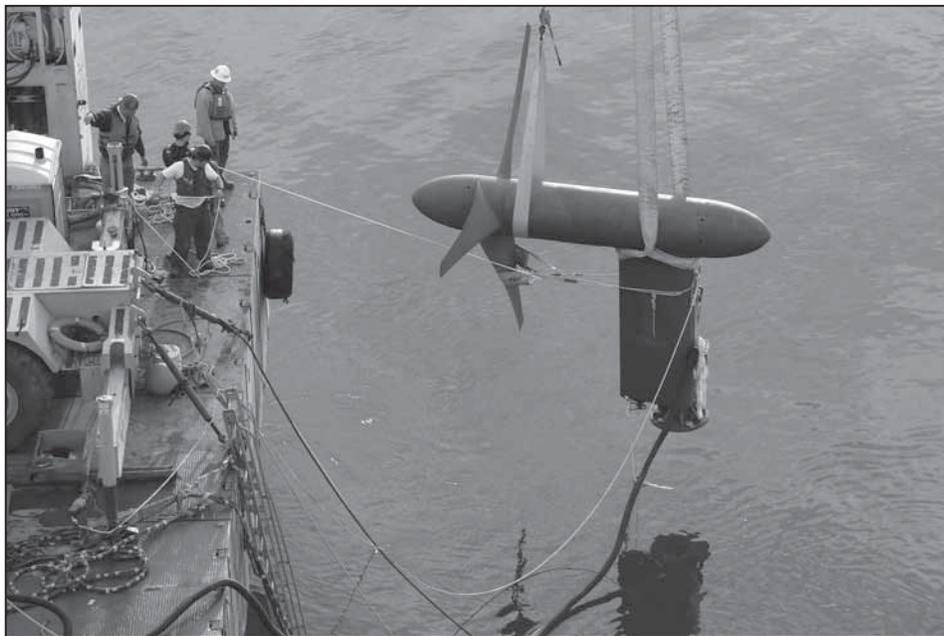
- Robert Browning

**T**he world's hydropower is now mostly produced by big, destructive dams. But new technological advances bring promise for a new wave of hydropower projects that leave rivers intact, flood no land, and produce energy around the clock. Tapping the nearly limitless power of the waves, tides, rivers, and constructed water-supply systems has the potential to supply much of the world's power cheaply, efficiently, and with few impacts. Before that can happen, however, technological bugs must be worked out and market barriers removed.

Efforts to harness moving water without building dams have been going on for centuries. The first patent for a device to tap wave energy was issued the year that George Washington became the first president of the United States. Although the world still has not widely tapped the power of the oceans to create electricity, "unconventional" (or dam-free) hydropower developments are gaining ground with pilot projects and research projects around the world.

Most of the attention being given this new field is on the world's oceans, which cover three-quarters of the world's surface. According to *Renewable Energy Access*, wave power alone could easily supply the world's energy needs, though much remains to be done to bring it to market. "Research and development of wave energy is still very young in comparison to other forms of renewable energy such as wind power," a May 2007 article in the magazine states. "But wave power - most likely produced by buoys that are anchored two to three miles offshore and move gently up and down with ocean swells - could produce steady and large amounts of electricity. Systems could be scaled up or down in size, whatever is needed to meet demand."

Areas with high prospects for wave power are the western coasts of Scotland, northern Canada, southern Africa, Australia, and the northeastern and northwestern coasts of the US.



*A free-flow turbine being deployed in New York's East River.*

Photo: Kris Unger / Courtesy Verdant Power

Studies show impressive potential for ocean wave energy sources. Overall potential for wave power is estimated to be at least 8,000 terawatt hours per year of energy (global energy use was about 15 terawatts in 2004), but some experts predict it is likely to supply just 15% of the current global energy demand, once technological advances make it cheaper and more reliable. Electric Power Research Institute calculates that wave energy alone could replace 7% of the total US electricity consumption.

### How It Works

There are two broad categories of unconventional hydroelectricity: energy that is generated from ocean waves and energy generated from hydrokinetic sources. Ocean wave energy potential exists near shore and on-shore, and separate technologies exist for each application. There are many sources of hydrokinetic energy with corresponding generation technologies, which include free-flowing rivers and streams, tidal currents and streams, ocean currents, and water movement through constructed waterways such as aqueducts and water-supply pipelines.

Unconventional hydroelectricity technologies do not rely on the conventional methods of impounding water by dams, diverting water, or pumping water into

storage facilities. New hydroelectricity technologies can avoid the negative impacts caused by large dams such as displaced people, destroyed habitat, flooded farmland, reduced downstream flows of water and sediment, and released greenhouse gases, among others. There are possible environmental impacts, however, including noise emissions, which can affect marine animals' sonar and reproduction; animal collisions with the devices, and sedimentation and turbidity around the devices. More studies are needed to better understand and mitigate future impacts. With responsible development, proper siting, and early stakeholder involvement, wave and hydrokinetic energy technologies have the potential to be among the most environmentally friendly power generation sources.

Wave and ocean power have technological similarities to wind power, but also have some significant benefits over harnessing other renewable energy sources. Wave energy has 15-20 times more available potential energy per square meter of earth than solar or wind power. A 49-foot-diameter hydro turbine can generate as much energy as a 197-foot-diameter wind turbine. While winds can be erratic, tides can be charted by the minute, which allows power companies to know exactly when the turbines will be generating

*continued opposite*

power. Most unconventional hydro technologies have very little impact on “viewscapes,” as they are submerged or barely visible.

Wind energy can also work in unison with wave and tidal power. Explorations for combining off-shore wind and wave developments into integrated systems have begun. Hybrid offshore wind and wave systems can utilize a shared transmission system, which increases the efficiency of the total system. Combined systems will also increase reliability and reduce maintenance costs.

## Energy from Water Pipes

Surprisingly, there is also huge potential to harness hydrokinetic sources of energy from irrigation pipelines, canals and aqueducts – even cooling systems. The total global potential has not been estimated. Free-flowing rivers and streams and tidal areas can also be tapped for dam-free electricity. A report by the Western Governors Association estimates that US western states could get an additional 4,000 MW from turbines in rivers alone, ostensibly with no new dams. The National Hydropower Association also estimates that there is great potential for retrofitting existing dams for hydropower.

Tidal power is another way to tap moving water that has huge potential. One of the beauties of tapping tidal cycles is that they are predictable and reliable. Sixty percent of the world’s population lives near coastal areas, meaning tidal power will generally have shorter transmission distances. Tidal power is, however, intermittent and not steady throughout the day and does not correspond with electricity demands. Places with high tidal ranges are the most effective for harnessing tidal power. Sites that experience tidal change differences of 5 meters (16 feet) or more have the highest potential, but here are limited sites with tidal ranges in this magnitude.

## Working the Bugs Out

A new commercial project that eventually intends to supply electricity to 8,000 homes through 300 turbines was installed in May in New York City’s East River. This project reveals the kinds of start-up problems the industry is grappling with. Most seriously, the East River proved more powerful than engineers thought, resulting in turbines breaking and the need for a basic redesign. *The New York Times* reported that all six of the project’s 20-foot-tall turbines, which look like propellers on masts, were shut down for repairs just weeks after the project was inaugurated. The company, Verdant Power, has spent more than \$2 million to study the impact its turbines might have on fish in the East River. The site is monitored around the clock to see

whether fish are harmed by the blades. So far, it appears that fish tend to swim around the blades, and none have yet been killed in the project’s turbines.

Although the Verdant project reveals some of the technical risks involved for developers, more often the biggest risk is the length and complexity of the permitting process. In July, the US energy regulatory body FERC proposed a change that would grant developers of small tidal projects a six-month pilot license, largely replacing a licensing process that can now take up to seven years and cost millions of dollars.

A recent article in the online engineering magazine *IEEE Spectrum* states, “The best way to commercialize tidal technology is to put turbine systems into the water and test and develop them by trial and error,” says William Taylor III, president of Verdant Power, New York City. Without demonstrations, says Taylor, no one will know wheth-

er tidal energy really works or how it affects the environment. But until someone can demonstrate that it works, people are loath to invest in the technology.

## Removing Market Barriers

Once all technical bugs are worked out, there are still major barriers to widespread development of the world’s unconventional hydropower resources. Some of the main barriers include:

*Difficultly transmitting power:* Many wave-power systems are placed off-shore, making transmission of the energy to end users more difficult than over-land transmission. Areas suitable for wave power are also often far from existing grids.

*High research and development costs:* Since the technologies are in the early stages, research and development costs are high, with little or no income to support the

*continued on page 15*

## Case Studies from the World’s Coasts

**South Africa:** In partnership with the Clinton Global Initiative, Finavera Energy, a Canadian wave power company, has committed to develop a 20 MW wave energy project in South Africa, at an estimated cost of \$40 million. Profits will go to alleviate poverty with power subsidies to community service centers and investment in rural electrification. The project plan will create accessible decentralized energy and jobs for locals. The project estimates that it will save \$2 million/year in fuel costs and will avoid 20,000 tons of CO<sub>2</sub> emissions.

The project sponsors are currently collecting environmental data, and initiating site selection. The plan is to employ the company’s AquaBuOy technology to generate 20 MW of power by 2011.

**Canada:** Students, staff, and administrators at Pearson College of the Pacific in British Columbia (BC) are behind a deployed tidal power demonstration at Race Rocks Island. The college has a 30-year lease to manage Race Rocks Ecological reserve, an island owned by the BC government that is an environmental reserve.

Two large diesel generators generated electrical power at Race Rocks. The College considered wind and solar technologies that were not feasible.

Clean Current Power Systems approached Pearson College to develop a wave-power project at the Race Rocks site. Generated electricity will transmit to the island through a buried cable in the seabed. The first power was generated in December 2006.

This community-driven project will allow for the testing of the tidal power system in the open ocean. Environmental impacts of the system will be recorded which will increase knowledge for future commercial-scale deployments. Students, Clean Current, and BC government agencies will closely monitor environmental impacts of this system.

**Alaska:** A proposed coal plant for the city of Seward drove members of the Resurrection Bay Conservation Alliance to look for cleaner energy alternatives. In addition to directly opposing the coal plant, the group put together a proposal on wind, tidal and hydropower alternatives, and presented it to the City Council. The council then voted down the coal project.

The Alliance first proposed a traditional hydroelectric power system on a local creek in their alternatives plan, but things got more interesting after they were contacted by a hydrokinetic energy firm. The firm, with offices in Slovakia and Austria, produces the StauDruckMachine, which is put directly in rivers, streams, creeks, canals, and channels. The system has a fish passage system. The company is now working to determine the specifics of potential sites in Seward.

# Madeira Dams on Amazon Get Go-Ahead

by Glenn Switkes

**A** more than two year-long licensing process for two controversial dams on the Amazon's principal tributary, the Madeira River, has culminated with Brazilian environmental authorities granting a provisional license to the projects. The Bolivian government immediately expressed concern regarding the dams' potential impacts on Bolivian territory, health, and natural resources.

The Santo Antonio and Jirau dams will be offered in late October to public-private consortia, who will bid for the right to construct them, and will then have to fulfill a series of requirements designed to mitigate the dams' impacts. Reports indicate the auction may be delayed by legal challenges raised by companies seeking to gain an upper hand in the competition, and the Bolivian government is considering its next steps, possibly pressuring Brazil to delay approval for construction of the dams until all relevant technical questions concerning the project's potential impacts on their country have been answered.

Most observers believe that the July 9 licensing decision was politically motivated. In March, technical experts at Ibama, Brazil's environmental protection service, issued a 221-page opinion against licensing the dams, and arguing in favor of new studies which would more accurately ascertain the project's likely impacts on the region's biodiversity. Officials of Brazil's electric sector began making statements forecasting blackouts in the near future if the dams were not approved. Around the same time, President Luís Inácio Lula da Silva demanded that Environment Minister Marina Silva issue a license or risk losing her job. In response, Silva engineered a shakeup at Ibama, breaking off the section of the agency responsible for licensing into a separate unit, relocating staff who were critical of the project to other areas, and promoting her assistant Bazileu Margarido to manage Ibama and oversee the licensing of the dams.

Instead of requiring the new studies called for earlier by Ibama, Margarido directed a series of questions to the project proponents. The project backers – Odebrecht, a Brazilian construction company, and Furnas, a state energy company – responded to only a portion of the questions posed, alleging that some were outside of the terms of reference for the environmental impact analysis, and that other issues would be dealt with during the construction phase of the project.



*The Madeira River.*

Photo by Wilson Dias/ Agencia Brasil

Despite the fact that their answers shed little light on critical issues surrounding the project, the provisional license was issued. Environmentalists and activists from the dam-affected peoples' movement have strongly criticized the dams and the process that has gotten them this far, but the projects' strongest critic may turn out to be the Bolivian government, whose foreign relations minister sent a strongly worded letter of concern to his Brazilian counterpart the day after the license was issued. David Choquehuanca wrote: "As we have repeatedly stated, Bolivia considers that, before any concession is offered to build hydroelectric dams so close to Bolivian territory, integrated Environmental Impact Studies must be carried out which analyze the entire Madeira basin, including the project's impacts on Bolivia." The Jirau dam would be built just 50 miles downstream from Bolivia.

Two weeks later, a high-level Bolivian delegation met with Brazilian government officials in São Paulo and demanded answers to a series of technical issues concerning the project's impacts. As a result of these meetings, Brazil's Foreign Relations ministry agreed to form a series of bi-national commissions with Bolivia to analyze the project's effects on the neighboring country. It is not clear what effect Bolivia's position will have on the project moving ahead.

Under Brazil's electricity sector rules, the right to build the dam will go to the consortium that offers to sell the energy generated to the national grid for the lowest price. The estimated cost of the Madeira project and of the energy the dams would generate have been steadily rising. In 2003, when the project was first presented, its cost was estimated at US\$5.25 billion. Latest estimates by Brazil's Electrical Energy Agency (ANEEL) show that the cost of the two dams has more than doubled to \$14.7 billion, including navigation locks which are part of the project. This figure does not include the 2,450km

*continued opposite*

## What is IRN doing?

IRN is completing a case study on the Madeira project, within the context of large-scale infrastructure projects being proposed in South America. The book, scheduled for release in October, will include analysis of the project's history, and technical studies including sediment accumulation, impacts on fish and fishing communities, probable effects of bio-accumulation of mercury in the reservoirs, and a view from the communities on the project's socio-economic impacts.

# Smaller May Not Be Better for Patagonia

by Glenn Switkes

**P**roponents of a proposed massive dam project in Chile's Patagonia region announced recently that they will reduce the size of the flooded area by more than a third. The proposal was met with skepticism by environmentalists, who see the move as an attempt to "green" the controversial project.

The HydroAysén project consortium (composed of Endesa, headquartered in Spain, and Colbún of Chile) announced in August that the area to be flooded by a series of dams on the Baker and Pascua rivers would be reduced from 9,300 to 5,910 hectares through changes in the project's engineering design. To achieve that goal, the companies say that they will instead build three, rather than two dams on the Pascua River, thus increasing the total installed capacity of the Aysén project to 2,750 MW. The consortium had stated that a minimum capacity of 2,400 MW would be necessary to justify the US\$1.5 billion investment for 2,000 kilometers of electric transmission lines connecting the dams to central Chile. This is in addition to the estimated \$2.43 billion for construction of the five dams.

Significantly, the area to be flooded in the Baker valley by two planned dams – the part of the project that has been a lightning rod for opposition by ecotourism companies, ranchers, and politicians in that region – would shrink by 43%. Although

## What is IRN doing?

IRN is working to build new alliances and to strengthen existing partnerships with Chilean and Spanish activists and groups that have been campaigning against the HydroAysén project. IRN is also working to pressure the dam builders and potential funders to leave the rivers of Patagonia dam-free.



Protestors at the confluence of the Baker and Nef rivers say no to dams in Patagonia.

Photo: Coalición Aysén Reserva de Vida

the Chilean government has not taken an official position on the project, Public Works Minister Eduardo Bitrán had publicly stated, "It is better to tell the company clearly that it should redesign the project, because it is incompatible with the development strategy which the region itself has designed in terms of tourism," implying that eventual approval for the project could be linked to the companies' willingness to reduce the area flooded by the Baker dams.

The Citizens' Coalition for an Aysén Life Reserve and Santiago-based Ecosistemas said the companies "would still be killing some of the purest water courses on the planet," and that bringing in thousands of workers to build the dams and crossing the pristine region with transmission lines "would be incompatible with the real sustainable development of the Aysén region and its people."

Confident it had achieved a publicity coup, the consortium announced its changes to the project in a small town near the site of the proposed Baker I Dam, saying that "community opinion" had played a role in

changing the project design. HydroAysén said it plans to submit the environmental studies for the project to licensing authorities by April 2008.

Less is known about the Pascua River, where the direct impacts of the dams will be most strongly felt. The Pascua River flows from the glacial-formed O'Higgins Lake through a remote area of temperate rainforests, which includes some of the most extensive remaining habitat of the *huemul*, an endangered Patagonian deer. The Pascua is also considered one of the most challenging rivers in the world for kayakers.

Environmentalists fear that the HydroAysén project will not be the only threat to the region from big dams. Swiss mining giant Xstrata has said it will re-submit an environmental impact assessment for a dam on the Cuervo River, which previously had been rejected by environmental authorities. Xstrata has also said it might build a second power line to Santiago if it is allowed to construct dams on the Cuervo and other rivers where it holds water rights. ■

Madeira continued

transmission line that will be required to link the Santo Antonio and Jirau dams to the national power grid, at an estimated cost of \$5 billion. For this reason, the cap on the purchase price for the Madeira dams is expected to be set by the government at more than \$70 per MWh, making electricity

from the Madeira the country's most expensive hydroelectric energy.

With Brazil planning more than 70 large dams in the Amazon over the next 25 years, the questionable manner in which approval of the Madeira project has been handled has raised concern over whether a serious

analysis of the impacts of future Amazon dams will even be allowed to take place. According to Iremar Ferreira of the Living Madeira Institute, "Lula decided he wanted the Madeira dams to be built, no matter what the cost. Now, it seems as if Amazonia is going to have live with its impacts." ■

## Building Friendships *continued from page 5*

which provides power for the Lao and Thai markets. The project, completed in 2004, affected thousands of people and flooded 1,000 hectares of national park. The project was the scene of the first ever villager-led protest, when some 40 ethnic Hmong men armed with sticks and guns, infuriated that they might be evicted from their lands without having received information about where they would be relocated, halted dam construction for five days (see *WRR*, April 2003). Chinese companies are known to be involved in developing at least eight proposed hydropower projects in Laos to date, including the controversial Paklay Dam proposed for the Mekong mainstream.

In the future, some projects are expected to export electricity to China, including the 640 MW Nam Ou 8, to be co-developed by Sinohydro Corporation and the Laos government. The project could affect up to 50,000 people, displacing some 7,000 in the reservoir area. The 300-square-kilometer reservoir would inundate part of Phou Dendin National Biodiversity Conservation Area.

### China befriends Burma

China has built close relations with Burma's military regime, pledging continuing economic cooperation, especially in the development of economic infrastructure. China has funded major road improvements that, at the same time, improve its access to Burma's Andaman Sea and Bay of Bengal deep-water ports. China's support for Burma counters US pressures on Association of

South East Asian Nations (ASEAN), undermining US and EU sanctions.

China has been a willing supporter of hydropower development in Burma, both for potential export to China and Thailand, and for domestic supply. It is the major backer and developer of the Myitsonne Dam in Kachin State, which would displace 10 villages along the upper Irrawaddy River. The project is one of seven or more dams planned by the same Chinese company, amounting to at least 11,760 MW. Three of the five hugely controversial dams on the Salween River (altogether around 15,000 MW) have known or suspected Chinese involvement (see *WRR*, October 2006).

### The ties that bind

China's reemergence as a global power has resulted in a renewed projection of influence into Southeast Asia, not attained since the time of the Ming Dynasty in the 15th century. In sharp contrast to the tribute-based relationship of the past, China has worked hard through economic support and diplomatic suaveness to present itself as a benign neighbor and dispel fears of a Chinese threat of hegemony in the region. Mainland Southeast Asia presents a complex playing field for strategic political games, a region of diverse states, cultures, and, of course, checkered historical relationships with China.

To allay the region's fears, China has engaged in multilateral dialogues, such as through ASEAN, and relaxed its claims in long-standing regional disputes. On the other hand, China has built strong, direct bilateral

links with Burma, Cambodia, and Laos, weaker members of ASEAN that hold key strategic economic and security interests to China.

China has also actively participated in the ADB's multilateral Greater Mekong Subregion (GMS) program, which focuses mainly on regional economic integration through major infrastructure developments. This program is completely in line with China's economic interdependence strategy and the opportunities this presents for China to progress its regional leadership aspirations.

In contrast to the weaker states of mainland Southeast Asia, China has sought to build economic cooperation and trade with Thailand and Vietnam, both of which have closer relationships with the US and are perceived as economic rivals to China. As an example of China's keenness to build economic interdependency, despite ongoing electricity shortages, China has signed agreements with both Thailand and Vietnam to export massive amounts of electricity in the near future.

Presenting itself as a friendly neighbor seeking win-win solutions, China has on the whole won over cautious Mekong region governments that have accepted the inevitability of China's rise and sought opportunities within it, including as a counter-balance to US regional influence.

Whether China can sustain its current benign approach towards diplomacy with its Mekong region neighbors is at present an open-ended question. In part it will depend on China fulfilling its promises on mutually beneficial economic partnerships, which in turn depends upon its own sustained economic growth – another open question. China has proven itself willing to support controversial infrastructure projects throughout the region in exchange for political points, and has generally adopted a non-transparent frontier-styled capitalism both with its government partners and private sector traders.

But China's aid projects are developed according to environmental and social standards that are substantially weaker than the already less-than-admirable standards of Western bilateral donors and Export Credit Agencies, and many of these projects will not endear Chinese investors to the region's general population. A better way forward would be for China to recognize the importance of healthy river systems to the region's people, and work to sustain these natural support systems for the common good rather than exporting their riches through the common grid. In the longer term this will ensure a fruitful result from China's efforts to build better relations with its neighbors, and a brighter future for all. ■

## China's Upstream Dams Undo the Charm

Despite sleek diplomatic maneuvers, like all great powers, on occasion China has acted unilaterally and in naked self-interest. Nowhere is this more readily apparent than on the Lancang River, the local name for China's stretch of the Mekong River that links Yunnan Province to its downstream Southeast Asian neighbors, and where China plans an eight dam cascade on the mainstream totaling over 16,000 megawatts. Two of the dams are already complete, and a further four are under construction. Villagers in downstream Thailand complain of dwindling fish stocks and erratic water levels because of China's dam operation.

Despite an open-ended invitation, China has declined to join the Mekong River Commission (MRC), formed 12

years ago by Cambodia, Laos, Vietnam and Thailand to help manage the international river upon which 60 million of their citizens depend. As the upstream country with an extensive hydropower development program already underway, China appears concerned that joining the MRC would cede too much power to those downstream.

Ironically, at the GMS conference in Kunming in 2005, Wen Jiabao told the delegates, "All GMS countries are close neighbors of China. Nourished by the same river, our people have fostered long-standing friendship... We are resolved to work together with other countries to further consolidate and develop traditional friendship and constantly expand equal-footed and mutually beneficial cooperation."

---

## China Dams continued from page 1

forward, including in Sudan. The expansion of Chinese dam builders also puts pressure on other companies and financiers to lower their standards in order to stay in business. The OECD Export Credit Group, which brings together the export credit agencies of industrialized countries, weakened its environmental standards in April 1997. Financial institutions thus use the emergence of China and other new financiers as an excuse to engage in an environmental race to the bottom, rather than to help them raise their standards.

### Hopeful signs

In spite of many questionable projects, China aspires to be a responsible global actor. Chinese companies have recently been hit by riots, labor unrest and kidnappings in various countries. This backlash has shown Chinese investors that they need to maintain friendly relations with their host communities if they want to establish a long-term presence overseas.

In 2006, China's Ministry of Commerce issued recommendations for improving the safety of workers in Chinese foreign investments. It urged Chinese companies to hire

local workers, respect local customs and adhere to international safety standards in their projects. China Exim Bank adopted an environmental policy in November 2004, and invited International Rivers Network to discuss its approach to the environment in December 2006.

The Chinese government is spending billions on the 2008 Olympics, and is sensitive to how public criticism may affect its image. In response to IRN criticism of the Merowe Dam, the Foreign Ministry stressed that "China attaches great importance to the local people's livelihood, takes the possible environment effect seriously and applies strict environment evaluation and standards." In March 2007, the Chinese government dropped Sudan from the list of countries which benefit from subsidized China Exim Bank loans. And according to international observers in Khartoum, China has so far not followed up on its earlier promise to fund the Kajbar Dam.

China's global economic expansion offers many benefits to poor countries. Yet in the standards of the dams it builds at home and abroad, China still has a long

## Because the world's life-giving rivers need to be defended today and tomorrow...

Making a bequest to International Rivers Network or our supporting organization, the Fund for International Rivers (FIR), can help ensure that we'll be able to continue the struggle for healthy rivers and human rights for future generations.

For information on making a bequest, contact Karolo Aparicio at +1 510 8481155 or karolo@irn.org.

way to go. International public opinion will expect China to comply with human rights standards just like any other dam-building nation. IRN will continue to support local groups around the world to hold Chinese dam builders to account for such standards in their projects. ■

---

## Hydropower continued from page 11

developer's efforts. The cost of permits, surveys, and connection to the grid all add to the cost of testing designs and prototypes.

*Difficulties surrounding site research and development:* Areas and opportunities for research and testing of new technologies are limited. Modeling wave and ocean conditions is difficult, and real world applications are necessary to realize full scale commercial operations to prove survivability, reliability, and scalability. Some suitable sites for testing and installing commercial scale applications are unavailable because access is taken by pilot projects that are testing immature technologies, or site banking. Site banking is the practice of requesting a permit for a particular site, without specific plans to develop the site, in order to keep the competition from developing the site. Merit-based competition could limit this barrier.

*Lack of investment money:* Understanding the energy conversion performance of new technologies is limited and makes it difficult to accurately predict energy output, which creates difficulties in securing financing.

*Permitting barriers:* Permitting has been cumbersome and expensive. Regulatory

agencies do not have policies and protocols to permit the new devices. The procedures they do have are designed for existing technologies that do not necessarily apply to the new technologies. In some cases multiple agencies must participate, and coordination is slow and difficult.

*Lack of information on environmental impacts:* This could prevent a demonstration project receiving necessary permits from regulatory agencies. Also, marine impact on the technology (such as algae growth) is unknown and may be important to future designs.

### The Next Wave

There are over 1,000 patented wave-energy technologies, and many companies working to develop projects. In the US alone, permits have been issued to 26 different companies, with 26 different technologies. It is hard to predict if any technology will come out ahead of others as the industry matures.

Because this emerging industry is still in its infancy, much remains to be worked out to bring it to market. Gregg Kleiner, of Oregon State University's College of Engi-

neering, says, "It's kind of like a gold rush right now to see who can come up with the best system." Technologies differ in scope, technique, design and purpose. Different systems can be placed near shore, off shore, floating or submerged. As more pilot projects and commercial-scale projects are installed, the menu of technologies will dwindle and market leaders will emerge. Unconventional hydro technologies are starting to attract traditional energy companies. According to the *East Bay Financial Times*, oil giant Chevron will invest up to \$2 million in a feasibility study of a wave energy project near the northern California coast.

Unconventional hydroelectricity technologies have the potential to allow communities to decide how their future power is generated. With continued research, development, and deployment, more systems will be available to offset the demand for environmentally damaging power generation technologies. The world desperately needs this industry to succeed, to help us solve the problems of growing energy needs in the face of global warming – and to protect the world's rivers. ■