Greenwashing Hydropower

On a hot May day, a peasant farmer named Bounsouk looks out across the vast expanse of water before him, the 450-square-kilometer reservoir behind the new Nam Theun 2 dam in Laos. At the bottom of the reservoir is the land where he once lived, grew rice, grazed buffalo, and collected forest fruits, berries, and medicinal plants and spices. Now there is just water, water everywhere.

“Before the flood I could grow enough rice to feed my family and I had 10 buffalo,” he says. “I like our new houses and I like having electricity in the new village, but we do not have enough land and the soil quality is very poor. Now I can’t grow enough rice to feed my family, and three of my buffalo died because they didn’t have enough food.”

Bounsouk is one of 6,200 indigenous people whose lands were flooded to make way for the Nam Theun 2 Hydropower Project in this small Southeast Asian country. His story is one that is heard over and over again in the project resettlement area. Though in certain places some people may be happy with their new houses, electricity, and proximity to the road, they are concerned about how they will feed their families in the long term. The poor quality of land and lack of viable income-generating options in this remote area make their prospects bleak.

Big dams have frequently imposed high social and environmental costs and long-term economic trade-offs, such as lost fisheries and tourism potential and flooded agricultural and forest land. According to the independent World Commission on Dams, most projects have failed to compensate affected people for their losses and adequately mitigate environmental impacts. Local people have rarely had a meaningful say in whether or how a dam is implemented, or received their fair share of project benefits.

The permanent inundation of forests, wetlands and wildlife is perhaps the most obvious ecological effect of a dam. Reservoirs have flooded vast areas —more than 400,000 square kilometres have been lost worldwide. Yet it is not only the amount of land lost which is important, but also its quality: river and floodplain habitats are some of the world's most diverse ecosystems. Plants and animals which are closely adapted to valley bottom habitats can often not survive along the edge of a reservoir. Dams also tend to be built in remote areas which are the last refuge for species which have been displaced by development in other regions. No one has any idea how many species of plants and animals are now extinct because their last habitat was flooded by a dam but the number is likely far from negligible. As well as destroying habitat, reservoirs can also cut off migratory routes across the valley and along the river. Because it isolates populations, this ecosystem fragmentation also leads to the risks of inbreeding from a smaller genetic pool.

Hydro Boom

The dam building industry is greenwashing hydropower with a public relations offensive designed to convince the world that the next generation of dams will provide additional sources of clean energy and help to ease the effects of climate change. In some of the world’s last great free-flowing-river basins, such as the Amazon, the Mekong, the Congo, and the rivers of Patagonia, governments and

industry are pushing forward with cascades of massive dams, all under the guise of clean energy.

Following a decade-long lull, a major resurgence in dam construction worldwide is now under way, driven by infusions of new capital from China, Brazil, Thailand, India, and other middle-income countries. In particular, Chinese financial institutions have replaced the World Bank as the largest funder of dam projects globally. Chinese banks and companies are involved in constructing some 216 large dams ("large" means at least 15 meters high, or between 5 and 15 meters and with a reservoir capacity of at least 3 million cubic meters) in 49 different countries, particularly in Africa and Southeast Asia, many with poor human rights records. A look at the heavy dam-building activity in China, the Amazon basin, and Africa illustrates the risks involved.

China. Half the world's large dams are within its borders, for which China has paid a huge price. Chinese dams have displaced an estimated 23 million people, and dam breaks have killed approximately 300,000 people. Dams have also taken a huge toll on China's biodiversity, causing fisheries to plummet, threatening the endangered giant Chinese sturgeon, and driving species such as the baiji, or Yangtze River Dolphin, to extinction.

Achieving the new plan's target would require building cascades of dams on several rivers in China's Southwest and on the Tibetan Plateau – regions that are inhabited by ethnic minorities, ecologically fragile, rich in biodiversity, and seismically active. If the new plan goes forward, it will irreversibly destroy China's great rivers and biodiversity hotspots of global importance.
Under its new Five-Year Plan, the Chinese government proposes to build 130-140 gigawatts of new hydropower plants. This equals more than one new Three Gorges Dam every year for the next five years, and is more than any other country has built in its entire history.

As a harbinger of the new trend, the Chinese government announced in February 2011 that it would allow a dam cascade on the Nu River (or Salween) – a pristine river which lies at the heart of a World Heritage Site – to be built. China's premier had stopped these projects in 2004 as a major victory for environmental groups. The government has also agreed to shrink the most important fisheries reserve on the Yangtze River so that a new hydropower scheme, the Xiaonanhai Dam, can go forward. This project may sound the death knell for the endangered giant Chinese sturgeon.

Around 30% of China's rivers are severely polluted with sewage, agricultural and mining runoff, and industrial chemicals, and the flows of some (such as the Yellow River) have been so dramatically altered that they no longer reach the sea. Free-flowing rivers with adequate oxygen and natural nutrient balances can remove or reduce the toxicity of river contaminants, but dams compound pollution problems by reducing rivers' ability to flush out pollutants and because the reservoirs accumulate upstream contaminants and submerge vegetation, which then rots. The water then released can be highly toxic and can have significant ecological and human-health effects downstream.

The Three Gorges Dam, perhaps the world's most notorious dam, generates electricity equivalent to that of about 25 coal-fired power stations. Yet the trade-offs involved are enormous. The project has been plagued by corruption, spiraling costs, environmental catastrophes, human rights violations, and resettlement difficulties. To date, more than 1.3 million people have been moved to make way for the dam. Hundreds of thousands of these people have received tiny, barren plots of land or have been sent to urban slums with limited cash compensation and housing. Those resettled in towns around the edge of the Three Gorges reservoir have seen the shore of the reservoir collapse in as many as 91 places, killing scores of people and forcing whole villages to relocate. Protests have been met with repression, including imprisonment and beatings.

The Three Gorges Dam is, unfortunately, the tip of the iceberg. In southwest China, at least 114 dams on eight rivers in the region are being proposed or are under development on major rivers, such as the Lancang (Upper Mekong), the Nu (Upper Salween), and the Jinsha (Upper Yangtze). Many of these projects are among the largest in the world, with correspondingly serious impacts on river ecology, displacement of hundreds of thousands of ethnic minority people, and concerns about the safety of downstream communities. Several of the projects are in or adjacent to the Three Parallel Rivers World Heritage Site, threatening the ecological integrity of one of the most spectacular and biologically rich areas of the world.

Of increasing concern is the potential for dams in Southwest China to trigger earthquakes. Recent evidence has emerged that the devastating 7.9-magnitude Sichuan earthquake of May 2008, which killed an estimated 90,000 people, may have been caused by the Zipingpu Dam. It is well established that large dams can trigger earthquakes through what is called reservoir-induced seismicity. Scientists believe that there are more than 100 instances of reservoirs causing earthquakes around the world. According to geophysical hazards researcher Christian Klose of Columbia University, “The several hundred million tons of water piled behind the Zipingpu Dam put just the wrong stresses on the adjacent Beichuan fault.”

The Amazon. Under the guise of promoting cheap, clean energy, Brazil’s dam builders are planning more than 100 dams in the Amazon. Already two big dams are under construction on the Amazon’s principal tributary, the Madeira, with several others in the licensing process. Brazil’s electricity-sector bureaucrats say these will be kinder, gentler dams with smaller reservoirs, designed to lessen social and environmental impacts. Legislation has been introduced that would fast-track the licensing of new dams in Amazonia and allow projects to circumvent Brazil’s tough environmental laws, under the pretext that they are of “strategic importance” to Brazil’s future.

By flooding large areas of rainforest, opening up new areas to logging, and changing the flow of water, the scores of dams being planned threaten to disturb the fragile water balance of the Amazon and increase the drying of the forest, a process that is already occurring due to climate change and extensive deforestation. New research confirms the critical role the Amazon plays in regulating the climate not only of South America, but also of parts of North America. The transformation of extensive areas of the Amazon into drier savannas would cause havoc with regional weather patterns. Lower precipitation, in turn, would render many of the dams obsolete.

Meanwhile, mocking one of the dams’ justifications, the greenhouse gas emissions could be enormous. Amazonian dams are some of the dirtiest on the planet; the Balbina Dam alone emits 10 times more greenhouse gases (from rotting vegetation in the reservoir) than a coal-fired plant of the same capacity. What’s more, the planned projects would expel more than 100,000 river-bank dwellers from their lands and seriously degrade extensive indigenous lands and protected areas.

The Santo Antonio and Jirau Dams on the Madeira River, currently under construction, have also raised the possibility that individual dams could affect a huge area of the Amazon Basin. Scientists have pointed out that several valuable migratory fish species could suffer near-extinction as a result of the Madeira dams, depleting fisheries and fauna thousands of kilometers up and downstream. The fertility of the Amazon floodplain, important for agriculture and fish reproduction, would also be impaired because a significant portion of the sediments and nutrients carried by the Madeira would be trapped in the reservoirs.

Another Amazon tributary under threat is the Xingu River. Brazil is moving forward with the construction of a huge dam on the Xingu, called Belo Monte. Belo Monte would be the third-largest

hydroelectric project in the world and would require diverting nearly the entire flow of the Xingu through two artificial canals to the dam's powerhouse, leaving indigenous communities along a 100 km stretch of the Xingu´s Big Bend without water, fish, or a means of river transport. The Belo Monte Dam would cause severe impacts to areas considered of extreme importance for conservation of biodiversity, as well as irreversible impacts to the Xingu´s fish stocks.

There is no doubt that meeting future energy needs of the Brazilian people is of crucial importance, but there are alternatives to more dams. Several studies, from WWF–World Wide Fund for Nature's to grass-root MAB's (Movement of those Affected by Dams in Brazil) - showed that Brazil could meet a major part of its future energy needs at lower social, environmental, and economic cost by investing in energy efficiency and renewable energy.

Africa. In Africa, dam construction is also on the rise. Africa is the least-electrified place in the world, with just a fraction of its citizens having access to electricity. Solving this huge problem is made more difficult by widespread poverty and poor governance, and because a large majority of the people live far from the grid, which greatly adds to the cost of bringing electricity to them.

The World Bank and many of the continent's energy planners are pinning their hopes for African electrification on something as ephemeral as the rain, by pushing for a slew of large dams across the continent. World Bank energy specialist Reynold Duncan told an energy conference earlier this year that Africa needs to greatly increase its investments in hydropower. "In Zambia, we have the potential of about 6,000 megawatts, in Angola we have 6,000 megawatts, and about 12,000 megawatts in Mozambique," he said. "We have a lot of megawatts down here before we even go up to the Congo."

Duncan said that governments and investors should not hesitate to look at riskier assets such as hydropower, adding that only 5 percent of the continent's hydro potential had been tapped. But "risky" is right. New African dams are being built with no examination of how climate change will affect them, even though many existing dams are already plagued by drought-caused power shortages.

Climate change is expected to dramatically alter the dynamics of many African rivers, worsening both droughts and floods. In this climate, the proposed frenzy of African dam building could be literally disastrous. Unprecedented flooding will cause more dams to collapse and hasten the rate at which their reservoirs fill with sediment. Meanwhile, worsening droughts will mean dams will fail to meet their power production targets.

Dams are not inexpensive investments: Just developing one of these dams, the Mphanda Nkuwa in Mozambique, is expected to cost at least $2 billion (not including the necessary transmission lines). Yet these huge projects are doing little to bridge the electricity divide in Africa. With the majority of the continent's population living far from existing electricity grids, what is needed is a major decentralized-power rollout of renewables and small power plants to build local economies from the ground up, not the top down. But that's not where the money is right now.

Corruption

These examples from three areas of heavy dam-building activity hint at the spectrum of major problems they present. Big dams always promise progress and development, but what the reality on the ground shows are displaced and impoverished refugees, ecologically fragmented and damaged rivers, and downstream victims of destroyed fisheries and impounded sediments. Big dams also

expand the habitat of waterborne disease vectors such as malaria, dengue fever, schistosomiasis, and liver fluke, and can trigger devastating earthquakes by increasing seismic stresses. Dams frequently fail to deliver their projected benefits and usually wind up costing more than predicted. And although hydropower is touted as a solution to climate change, many dams actually emit huge quantities of greenhouse gases. As Indian writer and activist Arundhati Roy has put it, “Big dams are to a nation’s development what nuclear bombs are to its military arsenal. They’re both weapons of mass destruction.”

If dams continue to wreak havoc with people’s lives and ecosystems, and are increasingly risky in a warming world, why do they continue to be built and promoted? And why are they now being hailed as a source of green, renewable energy?

One of the main reasons is vested interests: There are substantial profits to be had, for the hydropower industry, their network of consultants, and host-country bureaucracies, from planning, building, and operating massive infrastructure projects. These attractions often trump the impacts on people and ecosystems and the need to develop sustainable economies in the midst of a growing water and food crisis.

Industry consultants and engineering companies that undertake feasibility studies and environmental impact assessments know that they need to portray a project in a favorable light if they want to get future contracts. In case after case, and without comprehensively assessing the alternatives, they consistently claim that the impacts can be mitigated and that the project in question represents the best option for meeting the country’s needs.

Environmental impact assessments (EIAs) that should anticipate problems have served as a rubber-stamping device rather than a real planning tool. Jiang Gaoming of the Chinese Academy of Sciences reports that construction on many projects in southwest China is under way in violation of key aspects of Chinese law. Many projects lack an EIA and have not been approved by the government. According to Jiang, even basic safety checks have not been performed and government regulators are uninvolved. “EIAs have become a marginalized and decorative process, seen as just a part of the cost of doing business,” says Jiang. “Both the builders and local government know that, to date, an EIA has never managed to halt a dam project.”

Needless to say, corruption also plays a key role. A dam involves a huge upfront investment of resources, making it easy for government officials and politicians to skim some off the top. One of the most egregious examples of corruption involving a dam project is the Yacyretá Dam on the Paraná River, between Argentina and Paraguay. In the 1980s, the cost of this “monument to corruption” ballooned from an original estimate of $1.6 billion to more than $8 billion. In 2002 and 2003, several of the biggest dam-building companies in the world were convicted of bribing the former director of the Lesotho Highlands Development Authority to win contracts on Lesotho’s Katse Dam. Masupha Sole accepted around $2 million in bribes from major dam-building firms such as Acres International of Canada and Lahmeyer International of Germany. In China, corrupt local officials stole millions of dollars intended for people displaced by the Three Gorges Dam. At least 349 people have been found guilty of embezzling a total of about 12 percent of the project’s resettlement budget.

The Way Forward

Needless to say, these are not easy problems to address. The most ambitious and systematic attempt to date has been undertaken by the World Commission on Dams (WCD), a multi-stakeholder independent body established by the World Bank and the World Conservation Union in 1998. After a

comprehensive evaluation of the performance of large dams, the Commission issued its final report, Dams and Development: A New Framework for Decision-Making, in 2000.

Briefly, the WCD recommends conducting an open and participatory process to identify the real needs for water and energy services, followed by a careful assessment of all options for meeting those needs, giving social and environmental aspects the same significance as technical, economic, and financial factors. If a new dam is truly needed, outstanding social and environmental issues from existing dams should be addressed, and the benefits from existing projects should be maximized. Public acceptance of all key decisions should be demonstrated and decisions affecting indigenous peoples should be guided by their free, prior, and informed consent. Legally binding agreements should be negotiated with affected people to ensure the implementation of mitigation, resettlement, and development entitlements. Impact assessments should follow European Union and other global EIA standards. By definition, an effective EIA "ensures that environmental consequences of projects are identified and assessed before authorization is given"— something that almost never occurs in today's world. Dam projects built on international rivers should also evaluate the potential transboundary impacts or cumulative impacts from multi-dam projects in regional watersheds.

The dam industry has rejected the WCD guidelines and in 2007 established its own process, hoping to develop a sustainability protocol that will replace the WCD framework as the most legitimate benchmark for dam projects. But the industry approach is clearly an attempt to circumnavigate the more robust requirements of the WCD while paying lipservice to sustainability.

In fact, the industry's attempt to repackage hydropower as a green, renewable technology is both misleading and unsupported by the facts, and alternatives are often preferable. In general, the cheapest, cleanest, and fastest solution is to invest in energy efficiency. Up to three-quarters of the electricity used in the United States, for instance, could be saved with efficiency measures that would cost less than the electricity itself. Southern countries, especially those like China, India and Brazil with huge industrial expansion projects within an export-oriented model will account for 80 percent of global energy demand growth up to 2020. These countries could cut that growth by more than half using existing efficiency technologies, according to McKinsey Global Institute. "Technology transfer" programs can be an effective way to help poorer nations avoid having to reinvent the wheel; for example, California's remarkable energy efficiency program has been sharing knowledge with Chinese energy agencies and government officials to jump-start strong efficiency programs there.

Even with investment in efficiency, however, it will be necessary to look for new generation sources. In several Southern countries, sources such as wind, solar, geothermal, and biomass energy, as well as low-impact, non-dam hydropower, are gaining ground. Such technologies can be much better suited to meeting the energy needs of the rural poor, if they are being developed where people need the power and do not require the construction of transmission lines. Examples include the installation, supported by Global Environment Facility incentives, of hundreds of thousands of solar home systems in Bangladesh, China, Sri Lanka, and Uganda.

True renewables can also be an attractive and affordable solution to many countries' energy problems. The cost of windpower in good locations is now comparable to or lower than that of conventional sources. Both solar photovoltaic and concentrating solar power are rapidly coming down in price. A 2008 report from a U.S. National Academy of Engineering panel predicts that solar power will be cost-competitive with conventional energy sources in five years.

As for systemic corruption, it must be openly challenged by governments, funding agencies, and other proponents of dam projects. Regulations must be written to identify, define, and eliminate

corruption at all levels of the planning process. And the regulations must be openly supported and enforced by the World Bank, the dam industry, the national and transnational hydropower companies, and the governments supporting dam construction, projects that often involve amounts of billions of US dollars. And the dam industry itself, together with its biggest government allies such as China, Brazil and India, must take steps toward internal reform. Adopting the WCD guidelines would be a good first step, together with instituting such practices as integrity pacts, anti-corruption legislation, and performance bonds that require developers to comply with commitments.

Healthy rivers, like all intact ecosystems, are priceless. Southern countries should do everything in their power to protect these irreplaceable lifelines. One important step is to not copy the problem-filled energy model developed by Northern industrialized countries decades ago. Southern countries have cost-effective alternatives at their disposal that would enable them to leapfrog to a sustainable, twenty-first-century energy regime – one that is more sustainable, efficient, socially just, and strengthens local and regional economies. The alternative is, quite simply, a persistent legacy of human and environmental destruction.

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