RIVER KILLERS
THE FALSE SOLUTION OF MEGADAMS

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ABOUT THE AUTHOR

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A gain and again in recent history, humans have rushed headlong to adopt the latest discovery, invention, or technology, embracing them as the panacea to solve humanity’s problems in a particular field. We have done so with remarkable and mounting shortsightedness, even eagerness, due to the anticipated (and often real) economic windfall associated with the utilization of new technologies. In many cases, the secondary, synergistic, cumulative impacts of the latest miraculous techno-fix have been devastating.

Petroleum-fueled internal combustion engines, nuclear fission, DDT, chlorofluorocarbons, asbestos,… the list is long of “technological wonders” that spawned unintended consequences. The negative effects of the reckless use of these technologies are directly related to the lack of wisdom applied when taking the decision to deploy and use them. What is needed is a systemic and holistic approach to the temporal and spatial/ecological dimensions of technological developments.

Destroying wild rivers with large dams in order to generate electricity is one of the clearer examples of a false solution to humanity’s “need” for energy. Modernity has unnecessarily inflated this need; given the severe negative environmental impacts of electricity generation in general, it is amazing how superfluously and frivolously this form of energy is utilized. At this point in human history, our capacity to have blind spots regarding truly life-or-death issues has become one of our most prominent traits.

Large hydroelectric dams—with a height from foundation to crest exceeding 15 meters (49 feet)—are a new technology tied to the development of modern metallic cements, a history that dates back only some eighty years to the building of the Hoover Dam on the Colorado River in 1931. Since then, the number of large dams around the world has increased to more than 45,000, with the largest reaching 300 meters (nearly 1,000 feet) in height.1 Dams, interbasin transfers, and water withdrawals for irrigation have fragmented 60 percent of the world’s rivers.2 In geological and even human timescales these eight decades represent a very short time span, particularly when attempting to elucidate how this controversial megatechnology stands in terms of its cost-benefit equation.

With the building of the first hydroelectric megadams, the technology was touted as a clean, abundant, renewable, and cheap source of energy. Mounting evidence demonstrates that most of these assertions are ideological. Such claims are biased by the extremely profitable business that surrounds megadams all along their life cycle, which includes design, financing, environmental evaluation, and actual construction with its mobilization of workers, materials, and machinery.
Megadams are river killers. The transformation of watersheds and fluvial ecosystems—crucial components of the planet’s circulatory system—into hydraulic artifacts has proven to be extremely costly. Large dams degrade, homogenize, and impoverish rivers’ natural dynamics on local to continental to global scales, with serious global biodiversity implications. Most of the vital biological and physiochemical variables of rivers are altered by dams—water and sediment flows, temperature, oxygen content—with resulting upstream and downstream degradation of the food chain. The periodic manipulation of a river due to the operation of a hydroelectric plant results in flow fluctuations from zero water discharge to very large surges. This can, among other deleterious effects, eliminate a river’s natural seasonal cycles, even altering irreversibly the physical structure of river channels.

Developers have been particularly blind regarding the vital importance of riparian (riverside) ecosystems and wetlands for the health of rivers and hydrological basins. Rivers are an integrated whole from source to mouth. In fact, rivers and the watersheds that nurture them need to be understood multidimensionally, not linearly as a belt of water from which engineers attempt to reap as much kinetic energy as possible.

The negative impacts of large dams are also multidimensional, degrading in complex ways a watershed’s web of life. The capture of sediments within the reservoir via gravity is one example of an uncounted negative consequence. Sediments, both organic—called nutrients—and inorganic, are vital for the food chain. Nutrients, as the name indicates, nurture life, but inorganic elements are also indispensable for certain microorganisms such as diatoms, which are at the base of the marine web of life. Diatoms need the silica provided by rivers to build their exoskeletons.

In my country, Chilean marine biologists have defined Patagonia’s coastal ecosystems as “estuarine,” a term one associates with rivers rather than oceans. The scientists have concluded that rivers are the main ecological pillar of these coastal ecosystems; they supply both types of sediments, resulting in productivity typical of littoral waters, many times higher than in the interior seas. For this reason, marine fish come to the coast to spawn. Thus, degrading a fluvial ecosystem means degrading coastal ecosystems and even oceans. Killing a river can starve whales hundreds of kilometers away.

Another recent insight is that megadams are important emitters of greenhouse gases, particularly in tropical latitudes. Research by scientists at Brazil’s National Institute for Space Research (INPE) has demonstrated that the world’s large dams emit annually 104 million metric tons of methane, and approximately 15 percent of total anthropogenic greenhouse gas emissions. This is logical. Due to the putrefaction of organic matter, all bodies of water, natural and artificial, emit methane, which is at least 25 times more powerful than carbon dioxide in its greenhouse effect. Dams submerge soils and drown all forms of life previously existing within the flooded area. The emission effect lasts throughout a dam’s life cycle, given that the damned river keeps bringing organic matter into the reservoir. It is compounded by the fact that by massively destroying photosynthetic organisms, both plants and phytoplankton, dams eliminate carbon sequestration capacity. It is a double punch to the climate. With more than 45,000 large dams around the globe, their overall effect as climate changers has become a planetary problem.

Megadams are also weather changers at the level of basins. The stored water absorbs heat during the day and releases it at night, altering temperature regimes and wind patterns. Reservoirs also become massive evaporative devices, significantly augmenting humidity rates with unforeseeable consequences for flora and fauna. The weight of enormous volumes of water suddenly appearing in a valley can also induce earth tremors, a phenomenon called “reservoir-induced seismicity.” These and other documented impacts of megadams are clear, and they undermine the arguments of proponents who tout large-scale hydropower as a renewable, clean, cheap source of electricity.

The negative social consequences of large dams are proportional to their multiple environmental impacts, underscoring an obvious point: The social and the
ecological are totally intertwined. One of the most striking discoveries one will find when researching large dams is the uncertainty regarding their collateral damage to human communities. The relevant literature estimates that between 40 and 80 million people have been displaced—in many cases forcibly relocated—due to the building of large dams. China and India, the countries with the most people displaced by megadam projects, are not forthcoming with official information on the subject. Another trick utilized to hide the social impacts of dams is to artificially reduce, on paper, their area of influence. This is the opposite of a systemic analysis. In many cases, Environmental Impact Assessments are contracted, paid for, and edited by dam proponents, and the area considered is a limited footprint around the reservoir. Synergistic and cumulative upstream and downstream effects, and the overall integrity of the hydrological basin, are ignored.

A few years ago, I was among a group of megadam fighters from around the world who met in a school in a small Guatemalan village. For three days we were “stared at” by large portraits hanging from the walls around us of the 378 Maya Ach’ children, women, and men who had been murdered by the army to pave the way for the building of the Chixoy dam, funded by the World Bank, the Inter-American Development Bank, and the Italian government.

Since the building of two large hydroelectric dams on the Biobío River in south-central Chile in the late 1990s, the sacrificed region has become the poorest in Chile, with the country’s highest suicide rate (triple the national average). In the Upper Biobío, under the ominous shadow of two dams, 113 and 155 meters high, citizens must pay electricity bills that are among the most expensive in Chile, while in Santiago we pay the cheapest, an incentive for the sprawling city to keep growing.

Despite the documented ecological and social effects of mega-hydro projects, dam proponents continue to find receptive ears among government officials. The Three Gorges Dam in China is the most prominent recent example; the monstrous, 660-kilometer-long impoundment dammed the Yangtze River, flooding 258,225 acres, displacing 1.3 million people, and affecting another 10 million. Activists and local people are currently resisting similarly damaging projects such as the proposed Belo Monte dam in Brazil’s Amazon and the HidroAysén development scheme in Chilean Patagonia, one of the Earth’s last great wilderness regions.

The opposition to this destructive proposal is fierce. In 2005, a Chilean coalition called the Patagonia Defense Council launched the Patagonia Without Dams campaign. Today, thousands of conservationists and 69 organizations from multiple countries are working to stop both the damming of the Baker and Pascua rivers in the heart of Patagonia and the building of an associated transmission line (at roughly 1,200 miles long, largest of its kind in the world).

The Patagonia dams project is promoted by the Italian energy giant Enel, controlled by the Italian government, which retains 32 percent ownership. The anti-dams campaign has already delayed the project through organizing and litigation. The intense public education efforts of the coalition have been very successful in putting the cultural and ecological value of Patagonia before the eyes of the national and international public. Nearly 80 percent of the Chilean people oppose the project, and many Italian organizations under the “Patagonia Senza Dighe” campaign are confronting Enel at home for its intentions to dam Patagonia’s wild rivers.

An unprecedented Chilean citizen’s alliance is currently highlighting the megadams’ absurdity in terms of energy policy. A thorough technical proposal for a new electrical grid and policy has been drafted; the study demonstrates that the HidroAysén project is not only unnecessary but the worst step the nation could take regarding energy development. Chile has no power deficit at the moment and is blessed with a geography that makes it uniquely positioned to harness renewable sources of energy including solar, wind, geothermal, oceanic, biomass, and small-scale, run-of-the-river hydropower.

It is true that the world’s large dams have generated vast amounts of electricity. By 2008, hydropower...
represented 16 percent of the world’s electricity production, with plants in more than 150 countries. It represents over 90 percent of the total electricity supply in 24 countries and more than 50 percent in 63 countries. Canada, the United States, Brazil, China, and Russia account for more than half the world’s hydropower generation. Between 1973 and 1996 hydropower generation in non-OECD countries grew from 29 to 50 percent of world production, with Latin America increasing its share by the greatest amount in that period. The trend suggests that good hydropower sites in northern locations like Europe and North America have been largely exhausted, and/or projects are harder to implement due to externalities. Thus the trend to export the megadam business to the South.

In the North, some dams are even being decommissioned, a process that may be more expensive than the original construction. In some cases, the behemoths, with massive amounts of wet sediments behind huge walls of eventually collapsible cement, have become environmental “passives,” threats comparable to nuclear dumps. Who is responsible for demolishing river-killing dams, restoring the basin, bringing the river back to life, and helping disintegrated communities heal? Until now this crucial concern has not been evaluated in Environmental Impact Assessments and has not been considered in cost-benefit equations. The hard question after acknowledging the large electrical contribution of megadams is: Has this “cheap” electricity fueled sustainable development with clean energy, or has it powered overdevelopment with a source of energy that maims the biosphere, humanity included?

Considering our actual planetary situation, social and ecological, wouldn’t it have been much better to have abstained from the use of this energy, blindly seen as clean and cheap, and to have conserved the numerous hydrological basins and wild rivers now harmed by megadams? Wouldn’t it have been wise to protect the waters, the biodiversity, the hydrological and atmospheric cycles, the climate, the life of the littoral ecosystems and the seas, the fisheries, the livelihoods, the communities, the local economies, the beauty and grace?

We urgently have to think about energy in a radically different way. We have to assume that humanity’s fundamental challenge is not how to generate more but how to curtail demand and consumption. Then we have to reorient our societies toward the honest quest for the common good and environmental sustainability instead of toward rapacious profits generated from necessary social services. The overwhelming scale of ecological destruction that accompanies large dams is the direct consequence of current patterns of economic growth, of particular modes of so-called development and the concomitant technologies that support it and flow from it.

Large dams are a manifestation, a symptom of a pathological pattern compounded by ignorance and greed. Degradation of watersheds, and of local communities and local economies, is part of the nature of large hydropower dams. Far from being neutral technologies, they orient social processes toward more centralization and concentration of power over natural resources and ecosystems—euphemisms for vital organs of the biosphere—and capital, leading to more authoritarian and inequitable political systems.

We need to totally reject the lure of megadams and the energy gluttony they perpetuate, which deters us from deploying distributed power generation at a much smaller scale, administered at the local level, using all the genuinely renewable sources of energy. This is the path toward humans consuming less energy and less stuff, and toward letting nature produce more beauty and wildness.

While it can be daunting work, defending wild rivers from large hydropower projects is an honor. It is a privilege to become the human voice for all the life of a watershed, and to join a network of people around the world working for similar causes. We dream that soon more and more anti-megadam campaigns will be won, and the lost ones will offer lessons to learn from, making us appreciate the fearsome beauty of the present even more.
ENDNOTES


4 World Commission on Dams, *Dams and Development*.


7 World Commission on Dams, *Dams and Development*.

8 Ibid.
We have reached a point of crisis with regard to energy...
The essential problem is not just that we are tapping the wrong energy sources (though we are), or that we are wasteful and inefficient (though we are), but that we are overpowered, and we are overpowering nature.
— from the Introduction, by Richard Heinberg

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