



The Spectacular Batoka Gorge. Source: The Lowdown magazine.

# Batoka Gorge Dam, Zambezi River

## FLOODING OUT A NATURAL WONDER

The governments of Zambia and Zimbabwe are moving forward with plans to build the Batoka Gorge Dam, not far downstream from the magnificent Victoria Falls on the Zambezi River. Batoka is a large gorge of immense beauty, carved by the Zambezi into the strata of basalt rock over hundreds of thousands of years. The huge hydropower dam (it would be one of Africa's tallest) would create a large reservoir that would impact a UNESCO World Heritage Site, reduce river-based tourism, and drown habitat for endangered bird species.

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The main driver for the dam is to supply power to both Zambia and Zimbabwe. The development of the project will be under the auspices of the Zambezi River Authority (ZRA), a joint body tasked with overseeing development of the Zambezi River stretch shared by the two countries. Two power stations will be constructed (one on the north and the other on the south bank), with a combined capacity of 1,600MW.

According to the available project information, the Batoka hydropower project will have a 181-meter-high dam wall that will hold back 1,680 million cubic meters of water, covering an area of approximately 26 square kilometers. The reservoir will be long and narrow, stretching to just about 1km from the plunge pool of the Victoria Falls. This project is estimated to cost US\$4 billion and will take 10–13 years to complete. The preferred option being advanced is the Build-Own-Operate-Transfer (BOT) approach, involving private sector developers. Both the World Bank and the African Development Bank have expressed interest in funding the project, although there is no formalized commitment at the time of this writing.

### WORLD HERITAGE STATUS

Victoria Falls is recognised the world over as one of the seven natural wonders of the world. It draws millions of people from all over the world and has been a major tourist attraction for more than half a century. In 1989 it was designated a UNESCO World Heritage Site in recognition of its magnificence and in order to afford it world protection.

### ENVIRONMENTAL IMPACTS

Although the Batoka Gorge dam site has been under consideration for over 70 years, the first environmental impact assessment for the project was carried out in 1993. The study recommended further environmental studies that were then carried out in 1998. The dam will not inundate land since it will be confined to a long narrow gorge, but will flood all the rapids upstream and reduce the riverine natural habitat. The low settlement density in the area will minimize the number of people that need to be resettled.



The gorge is popular with boaters. Photo courtesy The Lowdown magazine

The gorge is a habitat for a number of rare bird species, and the project is expected to have major impacts on local endangered species. Birdlife International lists the Batoka Gorge as an ‘Important Bird Area’ on the basis of its conservation importance. Four species of note breed in the gorge, including the Taita falcon (a small, agile endangered raptor). Another 34 raptor species are also found in the gorge, including rare birds of prey such as Verraux’s eagle (previously known as the black eagle).

### SOCIAL AND ECONOMIC IMPACTS

Even though the dam is not associated with much human displacement, the social impacts will be significant. The Victoria Falls rapids represent one of the world’s best rafting spots, according to the International Rafting Federation. Water sports such as rafting and jet-boating, and land-based tourism to view the gorge scenery and Victoria Falls have created a huge tourism market, contributing to the economies of both countries as well as creating steady, long-term employment for thousands of local people. It is feared that the reservoir may not create the same amount of tourism-related benefits. Jobs resulting from dam construction will be short-term and most local people will not qualify for the highly skilled jobs associated with the project.

It is doubtful that the local communities will benefit much from the dam. The narrow and deep nature of the reservoir may not sustain large populations of fish needed to form a viable fishery. There is no information yet on how surrounding rural communities could benefit, nor have plans been advanced for connecting them to the resultant electricity grid.

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### IMPACT OF CLIMATE CHANGE

The Zambezi River basin has one of the most variable climates in the world. Its already extreme range of conditions is predicted to experience the worst potential effects of climate change among 11 major African river basins. An extensive report on the hydrological risks to Zambezi River dams by Beilfuss (2012) showed that climate change

is expected to increase variability and vulnerability of the basin. Harrison & Whittington (2002) carried out some climate modeling on the proposed Zambezi dams and found that the Batoka Gorge Dam is likely to lose 6-22% production due to declining rainfall as a result of a warming climate in the basin. In his 2012 report on the hydrological risks of planned Zambezi dams (Batoka included), Beilfuss reported that these dams are unlikely to deliver the expected services over their lifetime.

In addition to the economic risks from climate change, dam safety is a growing concern on the heavily dammed and hydrologically unpredictable Zambezi. Climate change threatens to bring more extreme floods and other changes to river flow that are not being taken into consideration in dam design or operation. Adding to that, dam safety risks from deferred maintenance, and the difficulties of managing multiple large dams during large flood events could put millions of people at risk in the Zambezi Basin. In early 2014, news broke that the river's largest dam, the half-century-old Kariba Dam (upstream from the Batoka site), was facing structural problems, setting off alarm bells throughout the basin. The governments of Zambia and Zimbabwe are reportedly scrambling to fund \$250 million in safety upgrades to the Kariba dam wall.

### **CURRENT STATUS OF DEVELOPMENT**

In December 2012, the Zambezi River Authority put out bids for investors interested in entering a BOT deal for the Batoka project. In April 2013 they announced that six international investors had been shortlisted. The ZRA also advertised for tenders for a new Social and Environmental Impact assessment in 2013, to be funded by the World Bank. At the time of writing these studies were underway.

The Batoka Gorge Dam project needs to incorporate internationally accepted standards for project development. Affected communities in Livingstone and Victoria Falls and other interested citizens should be fully consulted and notified of project plans at all stages. There is also need for a comprehensive energy needs and options assessment in order to come up with the best, least destructive energy development strategies.

In addition, development in the Zambezi basin needs to be better integrated. A basin-wide Cumulative Social and Environmental Impact Assessment should be carried out before the dam project proceeds to the next stage. The Zambezi basin offers numerous ecosystem services that are being compromised by the dam developments. A basin-wide analysis would provide adequate understanding of and accounting for these services.



Batoka Gorge, carved by the mighty Zambezi. Photo courtesy The Lowdown magazine



Climate change predictions have profound implications for future dams in the Zambezi Basin. The river is expected to have a 25-40% reduction in flow by 2050. When climate considerations are incorporated, the financial risks of Batoka Gorge Dam may make it uneconomic.

The Batoka project would be the third large hydropower development on the Zambezi River mainstem, after Kariba and Cahora Bassa, and the tenth large reservoir on the Zambezi system. The existing dams have already exerted huge impacts that include degradation of coastal mangroves; reduction in freshwater and prawn fisheries, floodplain agriculture, floodplain water supply and wildlife carrying capacity; and biophysical impacts such as the downcutting channels in the delta and reduction of the water table level. An additional dam would worsen these impacts. The project's social and environmental impact assessment scope is confined only to the project area. A Cumulative Social and Environmental Impact Assessment is the best tool to identify and manage the incremental impacts caused by an additional dam to the basin and especially downstream of all these developments.

### IS BATOKA THE BEST SOLUTION FOR ZAMBIA AND ZIMBABWE'S ENERGY NEEDS?

Batoka is a huge investment for the poor nations of Zambia and Zimbabwe, and its risks are very high. With climate change already affecting the Zambezi basin, the dam's

predicted revenue may never be realized. Zambia is very dependent on hydropower for its electricity supply. To minimize these risks, a comprehensive climate risk and options assessment must be conducted to ensure that the economic benefits are realistically assessed.

Zambia's current power production of 1,800MW is reported to have a shortfall of just 75MW during peak hours; this amount can be easily made up by upgrading existing power plants such as Kariba and Itezhi Tezhi, and instituting long-term energy efficiency measures. It is understood that Zambia will have a capacity of 3,000 MW in 2015 without including Batoka scheme, allowing it to export excess power.

Zimbabwe has a deficit estimated to be about 800MW. While Zimbabwe needs the power most, there are several cheaper options that will not involve destroying natural heritage and creating unsustainable debt for the country. The options include energy efficiency measures as well as promoting renewable energy options. An options assessment for energy in both countries is necessary.

These nations should think twice before condemning a beautiful gorge to destruction for the sake of less than 2,000 MW of power. There are cheaper, more sustainable options available for development.

Besides the rare bird species that will lose their ancestral habitats, local people around Victoria Falls and Livingstone in Zambia and Zimbabwe will be casualties as they lose their source of livelihood. The gorges and Victoria Falls have been a source of income to many through the tourism industry. The loss of the \$4 million a year rafting industry and the jobs it brings must be weighed as well. For Zimbabwe, the additional debt that comes with such a costly project will create a huge burden for the country.

## RESOURCES

UNESCO, "Mosi-oa-Tunya/Victoria Falls" <http://whc.unesco.org/en/list/509>

The Travel Guide to Victoria Falls, "Batoka Gorge Dam: Dam proposal threatens white-water rafting on the Zambezi" <http://www.victoriafalls-guide.net/batoka-gorge-dam.html>

The Lowdown Magazine, "Our Gorgeous Gorge" May 2013 <http://www.lowdownzambia.com/2013/05/31/our-gorgeous-gorge>

Beilfuss, Richard, 2012. "A Risky Climate for Southern African Hydro. Assessing Hydrological Risks and Consequences for Zambezi River Basin Dams." <http://www.internationalrivers.org/node/7673>

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