



Authors of Oxford study ignore real data about Itaipu and Renaissance dams

A few weeks ago the *Wall Street Journal* published an article titled "Ending the Flood of Megadams: The \$20 billion cost of the Itaipu Dam impaired Brazil's finances for three decades," hereinafter "Ending the Flood." The article was written by professor Flyvbjerg and doctor Ansar, both of whom are attached to the University of Oxford's Said Business School. The article references the authors' research conducted and contends that:

The evidence is conclusive: large dams in a vast majority of cases are not economically viable. Instead of obtaining hoped-for riches, emerging economies risk drowning their fragile economies in debt owing to ill-advised construction of large dams.

This article is only an opinion but since it purports to be based on scientific research, it may warrant closer scrutiny with regard to the presented facts and the conclusions. We detail here the data on two specific cases quoted by the authors, Itaipu and Grand Renaissance dams.

The authors state that:

Brazil's Itaipu Dam was built in the 1970s. It cost nearly \$20 billion, 240% more in real terms than predicted and it impaired Brazil's public finances for three decades. Despite producing much-needed electricity, Itaipu is unlikely to ever pay back its capital and debt costs.

To an unaware reader the Itaipu project may look like a disaster. The dam was completed in 1984, after a 7-year period of construction and according to Flyvbjerg and Ansar Brazil is still recovering from it. However had the authors bothered with checking the facts (easily obtainable from the publically available *2012 Sustainable Report* from Itaipu Binacional) they would have discovered the following.

The dam's current total debt stands at \$15 billion, and that amount is being repaid in annual installments of \$2.3 billion. Therefore, the debt is expected to have been fully repaid by 2023. Under the *Provisional Presidential Decree 579* issued by the Brazilian government in 2012, the debt amount repaid monthly to the Federal Government and Eletrobras is allocated to the Energy Development Account. This account is used to help to lower electricity prices for end-consumers. Debt repayment and interest represented about 60% of Itaipu's budget in 2012. In ten years, after the debt has been paid off, the company will be able to offer inexpensive electricity to Brazil and Paraguay for many decades to come.

At present Itaipu supplies over 17.3% of the energy consumed in Brazil and almost 73% of the Paraguayan demand. The production consistently exceeds the rated capacity of the generator units and the power plant's availability indicators are among the best in the world. Itaipu pays royalties for the use of water resources belonging to both countries. From 1985 to April 2009, the company paid almost \$7 billion in royalties to Brazil and Paraguay. The royalties are applied to improving the population's quality of life (education, health, housing and water supply/sewage treatment infrastructure).

Thus, contrary to what Flyvbjerg and Ansar claim, the project will pay off all its costs and then will continue to generate electricity for several decades, with minimal maintenance and operational costs. This is a very different picture from the one painted by the authors.



The Tekeze dam in Ethiopia, here under construction? By tapping into the renewable energy generation potential of the country's rivers, Tekeze increases power stability and provides reliable access to light, heat and water for 80 million people. It has played a key role in the economic development of Ethiopia.

Another 'disaster project' referred to by the authors is the Ethiopian Grand Renaissance Dam:

More recently, Ethiopia's \$4.8 billion Grand Ethiopian Renaissance Dam on the Nile, which began construction in 2011, will likely cost \$10 billion before its projected completion in 2017—nearly a quarter of Ethiopia's GDP. Instead of helping Ethiopia grow, the dam could drown the country's fragile economy in debt.

But what are the actual facts? According to Zadiq Abraha, head of the project's supervisory committee, the project will become partially-operational by September 2015 (750 MW production capacity) and when finalized in 2017, it will have a full production capacity of 6000 MW). The entire project will cost ETB 75.5 billion (approximately \$3.9 billion). The project is at present on track with respect to schedule and budget. There are no indications that the costs will be exceeded and reach the level of \$11 billion, and it is entirely unclear where Ansar and Flyvbjerg get that number from in the first place. According to Abraha, the Grand Renaissance Dam would generate annual revenues of some \$2 billion while providing countries of the region – such as Kenya, Djibouti, Sudan, Yemen and South Sudan – with a new source of electricity.

Could the dam drown the country's fragile economy in debt instead of helping Ethiopia to grow? Of course it could have but it appears from all available information that it won't.

To characterize these two hydropower projects as failures and disasters is, putting it gently and in the mildest terms, disturbing. On the Said Business School website, in an article titled "New research from Oxford University reveals severe cost and schedule overruns for large hydro-electric dams", professor Flyvbjerg is quoted as saying that

Experts making forecasts about megaprojects can be usefully grouped into "fools" or "liars"...The systematically poor outcomes of large dams suggest that "fools" and "liars" have been at the helm.

This assertion is echoed in the article at hand, wherein Flyvbjerg says that when it comes to the poor outcome of large projects overall, "fools or liars are at the helm when initial budgets are estimated." In view of the false and misleading assertions in "Ending the Flood," it may well be that its authors should be encouraged to re-think that authoritative and demeaning statement. They clearly did not do their homework at least on these two projects.

Flyvbjerg and Ansar also provide the reader with their recipe for success:

Our research shows that smaller, more flexible hydroelectric projects that can be built and go online quicker, and are more easily adapted to social and environmental concerns, are preferable to high-risk megadams.

They go on to point out that Norway could be a model of such an approach since it not only supplies 99% of its energy needs from hydropower but it also still encourages further development of small and mini-hydro. They seem to imply that if Norway can do that and be successful, then such model could be implemented elsewhere and therefore other countries should follow. This is a very naive approach that reflects a severe lack of understanding as to what is involved in hydropower generation.

Norway has exceptionally favourable conditions and because of its climate, topography and geology it has unique advantages for developing hydropower infrastructure. It has hundreds of small and medium sized rivers, streams and brooks without any large dominating rivers. This, combined with high precipitation and large differences in altitudes between source areas and the stream outlets provides numerous potential locations for small hydropower dams. However, it should be noted that in 2011, close to 128 TWh of electricity was generated in Norway with more than 95 per cent coming from large hydropower. In 2010 small hydropower plants with a total installed capacity of approximately 1800 MW between 930 of them were generating only about 7.6 TWh per year. According to World Small Hydropower Development Report 2013 the economically feasible small hydropower potential in Norway is only about 20 TWh/year. This means that even a country like Norway, with such unique and favourable conditions for small hydro development can only get a limited portion (not more than 18%) of generated energy from small hydro plants.

While it is fashionable nowadays to criticize the development of full hydropower potential, the critics still should get the facts straight and refrain from spreading false and misleading information. There is no doubt that many large hydro projects went over budget, often significantly, or were late in completing construction works. This is not uncommon in almost all areas of civil engineering and infrastructure development but we still build large bridges over rivers (instead of a large number of smaller bridges in upstream locations). Hydropower plants, whether large or small, cannot be built just anywhere for obvious reasons. The number of potential locations is always limited and in some countries these limitations are quite severe. Should these countries abandon the hopes of energy self-reliance in order to satisfy the criticism coming from comfortable, well air-conditioned offices in developed countries (often supplied by energy coming from large dams)? Dr. Teshome Adugna from Unity University in Addis Ababa has the following thoughts to offer in response to development of the Ethiopian Grand Renaissance Dam:

According to the latest World Bank report, Ethiopia is paving the way to join the middle income by 2020. In order to maintain such economic development the country must maintain proper and efficient utilization of its rich natural resources.

Ethiopia's white gold is water that provides various contributions for economic development. The construction of the EGRD has a number of impacts on the Ethiopian economy: increase in energy supply, additional foreign currency, increased water storage capacity, regional cooperation/integration and industrial development.

Such contributions of the EGRD will accelerate the reduction of poverty in the country. There are no international laws that say Ethiopians must die in poverty. In all our capacities we have to put all our efforts together for the completion of the EGRD that will change the economic structure of the nation for future prosperity.

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