

Response to Joseph Hanlon's "Mphanda Nkuwa & hydrogen, special report" - <https://bit.ly/Moz-555> by Justiça Ambiental JA!

CLIMATE

Even if we could agree that hydrogen is an important fuel for the energy transition, which we definitely cannot, it seems irresponsible to mention it in the case of Mphanda Nkuwa without acknowledging the fact that the creation of a reservoir contributes immensely to climate change - either by the simple condition of change of environment from ground to water, which causes changes in the rate of absorption or reflection of solar rays, either by production or release of its own gases, for example CO₂ (from the aerobic decomposition of biomass) and Methane CH₄ (from the anaerobic decomposition of lignified matter). It is estimated that greenhouse emissions from dams amount to around one billion tons annually. You have been very rightfully talking about methane emissions in relation to the gas projects in Cabo Delgado. Why totally disconsidering it here then?

Apart from contributing to climate change, mega-dams are also extremely affected by the impacts of the changing climate. Numerous dams around the world have failed to meet production targets due to changes in flow, rainfall, droughts etc, many of these provoked by climate change and predicted to only worsen. In Richard Beilfuss's analysis of 2012 "A Risky Climate for Southern African Hydro" he looks at the hydrological risks and consequences of dams in the Zambezi, and explains why it is so crucial that any dam project incorporates climate change scenarios into hydropower design and operation. In addition, the Intergovernmental Panel on Climate Change (IPCC) predictions for the region are also dire and place many risks on hydropower production. JA also conducted some climate model simulations with University of Cape Town (UCT) and found similar results of worsening droughts and more intense floods for the Zambezi basin which places additional risks on hydropower development. In addition, it must be noted that dams, especially hydro-electric dams which require reservoirs to be maintained at high levels to meet production needs, worsen the impacts of floods. Cahora Bassa's role in worsening floods has been well documented and studied.

Regarding Mphanda Nkuwa, climate change considerations have never been incorporated into the project design in previous years. Now Director Carlos Yum says he hopes the environmental and risk assessment studies can be completed in 18 months - there is no reason to believe they will add valid climate change studies for the first time now. It is very likely that the Mphanda Nkuwa dam's projected production will be largely **overestimated**. Low hydro power production in exchange for more cyclones.

Hence it is clear that climatic changes projected for the Zambezi basin will add economic risk to the planned Mphanda Nkuwa project. This is more concerning considering dams in general are difficult projects to make economic projections. Both the World Bank and World Commission of Dams (WCD) studies found that 50% of dams haven't met their projected economic targets. Climate change is making it even more difficult to project the baseload, available flows for production, minimal flow requirements, etc. Climate change will exacerbate the impacts of droughts, periods of low rainfall, impacts of floods.

ENVIRONMENT

"The environmental damage has already been done... Using the water twice should cause little further downstream disruption" - jh

We couldn't disagree more with this statement. The Mphanda Nkuwa dam will once again influence the flow of the Zambezi River, which already supports Kariba and several other dams and is expected to host more - such as the 2,400 MW Batoka Gorge dam in Zimbabwe / Zambia. The most direct consequence is the destruction of irrigation systems downstream of the dam. This disruption will affect aquaculture in the

Zambezi River Delta. The United Nations (UN) has disagreed with the Mphanda Nkuwa dam project, calling it "*probably the least environmentally acceptable large dam project in Africa*"¹.

The current flow regime of Cahora Bassa does not meet environmental and social flow requirements and is having a devastating effect on the delta. There is a lot of work being done to get Cahora Bassa to meet flow requirements. However, Mphanda Nkuwa is designed with the current damaging flow regime of Cahora Bassa and it is acknowledged in Mphanda Nkuwa EIA that changes in Cahora Bassa's flow regime to be more environmentally and socially just, will have a detrimental effect on Mphanda Nkuwa's economic viability. So if Mphanda Nkuwa goes forward, there will be no chance to have a sustainable Zambezi river and delta downstream.

In 2011, JA extensively commented on the Environmental Impact Assessment done by Impacto, raising serious concerns about the ways with which the studies had been conducted, the disregard for several important elements (for example the insufficiency of data for the sediments analysis, unable to provide a valid scientific analysis), the lack of rigour of the methods, the unreasonable optimism with regards to environmental risks and others, and recommended a series of additional studies and analysis to be done. This ridiculous EIA concluded that "the Mphanda Nkuwa dam project is environmentally viable, and its benefits will be greater than its negative impacts, if these are properly minimized". What makes us think the impacts will be minimized? What other mega project in Mozambique could serve as an example?

The lack of analysis of cumulative impacts of the numerous existing and planned dams on the Zambezi basin is a big concern. For example, more than 90% of the Zambezi catchments are dammed and an estimated 70% decrease in sediment load is caused by the Cahora Bassa Dam alone. Hence, planning of Mphanda Nkuwa or any dam requires strategic analysis of the Zambezi basin to understand the cumulative impacts on the ecosystems. Unfortunately, and by purposeful design, EIAs only look at impacts of the specific project which makes it easy to compartmentalise the different impacts and this process always underestimates the true scale of the negative impacts. In fact, even one of the consultants working on one of the past EIAs, mentioned the risks to the health of the Zambezi delta is 'death by a thousand cuts'. It is always possible with a bit of creative manipulation to justify one more project but the cumulative impacts are ignored.

SEISMIC

The Mphanda Nkuwa dam site is located close to (within 1 km of) a major fault system, the Chitima-Tchareca Zone (CTZ), which forms a tectonic link between Karoo half-graben structures of opposite tectonic polarity. Chris Hartnady is a world-renowned seismologist from University of Cape Town and is considered one of the top experts of southern Africa's seismology. He wrote "Critical review of the EIA and Seismic Hazard reports for the Mphanda Nkuwa project", where he points that the combined Estima-CTZ array constitutes a major hazard to the seismic safety of the proposed Mphanda Nkuwa dam, and discredits the findings of the EIA. He also notes the possibility of a future episode of reservoir-triggered seismicity (RTS) that could conceivably escalate into a major (>M7) event along some critically-stressed part of this Estima-CTZ fault array.

The seismic risks that are being underestimated here could turn a harmful project into a catastrophic one.

SOCIAL

Tete is the province of mega projects and not coincidentally major land conflicts. There is not much more good arable land where subsistence farmers can be resettled. Families resettled by Vale, Jindal, Rio Tinto, are still waiting for adequate machamba lands that were promised to them. The communities that will be mostly affected by Mphanda Nkuwa are fisherfolk, artisanal miners and farmers, who don't live a life of abundance but have plenty of fish, goat, vegetables and fruits to eat every day, and rely on the river and its banks for everything. It is totally unrealistic to believe they would be properly and fairly resettled elsewhere.

1 <https://www.world-energy.org/article/17992.html>

In the case of the Mphanda Nkuwa dam, as in so many others, the risk of project failure is being borne disproportionately by those individuals who have the least power in determining the success of the project. In all our years working with the communities in that region, we have clearly seen a moment when people were enthusiastic with the prospects of the dam, and optimistic about getting jobs and development in their area. Studies were made, companies and government visited the area, they made an inventory of the people living there and their belongings, and told everyone that they were not allowed to build anything else, invest in their houses, or form new families, because they would not be compensated for anything that had not been registered. Years passed without hearing anything else from government or companies. People lived in limbo for some time, young people left the community, nobody wanted to invest in improving their houses or community infrastructure. The community was slowly going back to normal when news about the dam came again in 2018-2019 (transmitted to them by JA based on news articles and government statements, nothing was communicated to them by the government). In all our recent encounters, the communities are telling us loud and clear that they are not leaving their land and are not accepting this dam. They talk about the inhumane conditions their relatives and friends are living in Nhamatua (Jindal's resettlement village, in a land that had been previously appointed for Mphanda resettlement), they talk about Cateme and Mualadzi, they talk about the destruction they face every year due to HCB's releases, more out of pattern every year. The communities seem to have become somewhat realistic as to what could be brought on them by the dam. What will be the government's approach if they face local resistance to accept the project?

It is catastrophic that the Mozambican government, and several sectors of our society, continue insisting on the same path of development through mega investments, where we keep falling in the same traps, and continue disregarding the social tensions building up (and bursting out) everywhere due to land conflicts, rising injustices and the necropolitics of our governance. We are paying the cost of these choices already, and things could potentially get a lot worse, especially if we keep forcing historically neglected people out of their land and totally dispossessing them of rights, livelihoods, and a sense of purpose.

GOVERNANCE, COLONIALISM AND NEOLIBERALISM

We believe you are well aware of all this but still we invite you to read Dr. Allen Isaacman's "Harnessing the Zambezi", shared in the link above.

The collusion of the Frelimo elite with the transnational capital elites within the current neocolonial-neoliberal paradigm is what keeps Mozambique trapped in the resource curse - as is with virtually every other global South country. As you rightfully pointed out, we have seen the boom and bust with coal (JA has been working in Tete since before the coal boom - we certainly do remember the hype and how everybody in the country believed Vale and others were our gateways to development), and we are seeing it with the gas (expectations were equally high as with coal, but this bubble is deflating much quicker... and the elites are now starting to adapt their strategy of profit from gas revenues to war revenues). All these variables are still in place with regards to Mphanda Nkuwa - the same corrupt elites selling the country, the same (or equivalent) transnational companies flying above, the same profit-driven open market regime defining the rules of the game, and the same inefficient national, regional and international bodies overseeing it all. This makes it obvious that local communities will still not gain from Mphanda Nkuwa, the companies involved will still get out of it with highly profitable contracts, and we will continue trading our future under the climate crisis for short-term gains from dirty and harmful energies.

After several letters and requests for a meeting with the Gabinete de Implementação do Projecto Hidroeléctrico de Mphanda Nkuwa (GMNK), since 2019, we finally got a response from them earlier this year and managed to have a meeting. What we heard was that they were still evaluating which documents and analysis previously done could be used - not because of their scientific relevance, but merely those who were not protected by intellectual property rights - and that efforts were underway to ensure the "bankability" of the project. No real timeline, guidelines for public participation, or reasons for advancing with this project without a public debate on energy priorities were shared with us. They reiterated often the economic viability was primary and the other issues were secondary once that was established.

Dams are also very well known for their huge kickbacks in construction contracts. The Belo Monte scandal in Brazil and many others showed us the pattern, and there is definitely a lot of potential for the same to happen here.

So what reasons are there to believe that this mega-project would benefit the country? Or even just bring rural electrification to that whole area? Don't we rather need - urgently – a debate around energy priorities and how to improve energy access especially in the country side, given our climate vulnerabilities and others?

We have launched a petition to stop this project, at least until fundamental questions are thoroughly discussed and dealt with.

HYDROGEN

We have major concerns around the risks associated with hydrogen and the over-optimistic projections and speculation around this sector. Millions have been invested by fossil fuel gas companies to lobby to prioritize hydrogen and this has driven up speculation. For example, Corporate Europe Observatory's (CEO) latest report found that the hydrogen lobby spent 58.6 million euros to influence Brussels policy makers and had 4 times more meetings with high ranking Commission officials than all NGOs did on energy. It is also well-documented the revolving doors and other manipulations, over-hyped projections and unrealistic economic potential operating around hydrogen.

Hydrogen has been used as a counter-argument by the gas industry to increase confidence of investors because of the risk of stranded assets. So they are highlighting hydrogen as a alternative energy output from new gas investments, even though economically **there are** many bottlenecks to hydrogen that haven't been solved, and there is very little to no real intent to do so. Unfortunately, other projects with different economic risks are now also starting to use the hydrogen hype as a way to falsely decrease economic concerns and risks, and hydroelectric dams are the latest addition to this group. Mphanda Nkuwa has always had a complicated problem with trying to negotiate a fair and long term power purchase agreement, given the monopoly of Eskom and the lack of other options and limited access to markets. The hydrogen argument could be used to improve the economic projections and negotiations, without dealing with the major limitations of new and fledgling hydrogen sector that has so many risky unknowns. This would again replicate the same mistakes Mozambique already made with coal and gas, of having over-optimistic and unrealistic expectations. Even Europe has very weak and limited hydrogen infrastructure and has a long way to go to make hydrogen a reality. The technology is still in its infancy, with aspects like processing, transport, etc more than decades behind other sectors like fossil gas, and in the case of gas we are now realising how much the sector has been underestimating losses, leakages and releases of gas within the life cycle and the true impacts of the gas. In addition, the palladium and rhodium inputs into hydrogen fuel cells are worrying due to already mining-related violence for example in the vast South Africa platinum belt, same for lithium, titanium dioxide, other heavy sands extraction in Mozambique and South Africa.

Another concern is the level of control that the fossil fuel sector has over the future of hydrogen. They control numerous hydrogen-focused bodies and think tanks. The manipulations to increase hydrogen projections and create a false hype is scary and makes any sound planning impossible. In the USA, a public relations firm, FTI consulting even created fake grassroots groups that were key to supporting the hydrogen hype.

For fossil fuel companies, the intention to use gas to drive the hydrogen shift is clear, with numerous studies showing how gas infrastructure can be reused and adapted to hydrogen. Then when one looks at the nationally determined climate plans, it is clear that Europe needs to stop emitting within its territory, to meet its targets, but they could still import dirty or fossil-based hydrogen from Russia for example, who may care less about meeting its targets. Europe can meet its "ambitious" climate targets while the global climate crisis will of course continue to worsen and devastate countries like Mozambique. So for countries that are prioritizing their national emissions targets over global emissions reductions, clean hydrogen or dirty hydrogen is the same. The main hydrogen technologies being developed currently, that have the best

economical viability and are already in use or close to being in use, are for dirty hydrogen, with less than 0.1 per cent of the hydrogen in Europe coming from clean sources or processes.

Why is this of concern to Mozambique? If Mphanda Nkuwa dam developed a hydrogen plan, but most of the potential markets like Europe were expected to use gas to be a big source of hydrogen, then that would severely disadvantage “clean” hydrogen from countries like Mozambique that have huge infrastructure bottlenecks, zero processing ability and huge transport costs. Not to mention there will be market implications with the sudden boom in hydrogen when the gas to hydrogen transition occurs.

The hydrogen hype has a lot of similarities to the over-optimistic projections from Mozambique’s coal and gas dreams. The harsh realities of those became clear too late. The same will happen with the hydrogen if we make plans in the midst of the gas lobby’s hijacking of the truth around hydrogen.

Wetransfer link with studies – <https://we.tl/t-QfLxtqkRgj>