



Figure 1: Belo Monte's construction site in Belém/PA, Brazil. (Ecodebate, 2015)

Belo Monte Dam: drowning gods for development

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Abstract

In 2010 the Brazilian Federal Government started the construction of which was planned to be the third biggest hydroelectric power plant in the world, Belo Monte, in the cities of Altamira, Vitória do Xingu and Senador José Porfírio, in the Amazon rainforest, the state of Pará, Brazil. This enterprise was very controversial because of the displacement of local communities and indigenous villages, as well as the great environmental impact on the Amazon rainforest. This work intends to analyze the historical process involving the studies to measure the hydroelectric potential of the Xingu River Basin and to assess the decision-making process that led the Brazilian Government to continue implementing this enterprise despite the social outcry and the heavy reaction against it from the impacted communities, the social movements, the scientific community and other actors, but specially taking in consideration the struggle of the native communities, also called indigenous peoples.

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List of abbreviations and acronyms

ANEEL	Agência Nacional de Energia Elétrica (National Electric Energy Agency)
CIMI	Conselho Indígena Missionário (Indigenous Missionary Council)
CNPE	Conselho Nacional de Política Energética (National Council of Energy Policy)
Eletrobrás	Centrais Elétricas Brasileiras S/A (Brazilian Electric Power Plants' Centre)
Eletronorte	Centrais Elétricas do Norte do Brasil (Northern Brazilian Electric Power Plants' Centre)
FUNAI	Fundação Nacional do Índio (National Indians Foundation)
HP	Hydropower Potential
IACHR	Inter-American Commission on Human Rights
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute of Environment and Renewable Natural Resources)
MAB	Movimento dos Afetados por Barragens (Movement of the Affected by Dams)
MME	Ministério das Minas e Energia (Ministry of Mines and Energy)
OAS	Organization of American States

Introduction

This report intends to analyze how was the decision-making process to build the Belo Monte Dam and how it impacted the lives of the native indigenous communities living in the area meant to be flooded or its surroundings. Brazil strongly relies on hydro power to meet its demands for electric energy. The country has an electric power matrix with 61.341% of hydroelectricity, coming from 140 plants in operation, with a perspective of increasing the use of this source (ANEEL, 2017). The country has used hydroelectric power since the end of the 19th century, but the 1960s and 1970s marked the phase of greater investment in the construction of large power plants, coinciding with the starting point to develop what would be Belo Monte in the year of 1975, during the military dictatorship years in Brazil. In Brazil is installed the world's largest power generation hydroelectric power plant, inaugurated in 1984 after a bi-national agreement with Paraguay, the Itaipu Power Plant, with an installed capacity of 14,000 MW. In total, Brazil has 4,655 projects in operation, totaling 151,648,982 kW of installed capacity (ANEEL, 2017). The National Electric Energy Agency also affirms that an additional 24,787.201 kW is expected to be added in the next generation in the country's generation capacity, coming from the 241 projects currently under construction and 575 in projects with construction not started (ANEEL, 2017).

However, relying on that much on such a controversial and impacting source of energy is tricky for a nation the size of Brazil, land of more than 200 million inhabitants. Developing big projects like Belo Monte affects thousands of people, and in the case of hydroelectric power plants in Brazil, the most vulnerable portions of the population, considering the dams are often built in the poorest areas of the country, in Northern and the Northeastern states. Those are not just the poorest regions of the country, as well they concentrate concentration the biggest number of indigenous populations.

Correlating those native populations and the impacts of a project of such magnitude as Belo Monte, through literature review, this report will analyze the background of the choice and decision-making over the years (and even decades) which culminated with the beginning of the construction of the power plant in 2010. Along with the construction of this dam, the passionate debates continued, as well protests and discussions about the limits of development over socio-cultural-environmental issues, in special how it affected the indigenous peoples and how they reacted to it.

1. The Belo Monte Hydroelectric Power Plant

The Belo Monte Dam Complex is a collection of three hydroelectric dams, the third largest dam in the world and will have an installed capacity of 11,233.1 MW, with two reservoirs that, together, cover a total area of 516 km² on the Xingu River (Silveira, 2016). It is one of the most important projects of the “Growth Acceleration Program”, a set of policies and projects aiming to accelerate the development in strategic areas and regions in Brazil. The prospect of building hydroelectric power plants in the Xingu River Basin, between the states of Mato Grosso and Pará, began to be studied in the 1970s, proposed during the military dictatorship period in Brazil and after four decades continues to carry a great amount of controversy and passionate debates (Fainguelernt, 2016). The Belo Monte dam project itself was settled by the private company’s consortium Norte Energia and sponsored by the Brazilian Federal Government, with the main stakeholders being Eletrobrás and its subsidiaries Eletronorte and CHESF, having a 49.98% stake in the project. However, “state-owned or state-controlled participation in the consortium totals 77.5% dwarfing the role of private sector investors and reflecting concerns about the financial risks” related to Belo Monte (Millikan, 2010”).

The Northern State-owned company Centrais Elétricas do Norte do Brasil (Eletronorte) started the studies in the area and later, the research and studies were transferred to the Centrais Elétricas Brasileiras S/A (Eletrobrás), a State-owned company as well, but in the Federal sphere, together with the different private contractors. In the year of 1975, the studies for the hydroelectric exploitation of the Xingu River Basin were initiated. In 1988 the Brazilian Ministry of Mines and Energy (MME) authorizes Eletronorte to start the feasibility studies specifically for the Hydroelectric Potential (HP) of Belo Monte, concluded one year later. In 1994 this feasibility studies for the HP of Belo Monte are revised, taking now in consideration a smaller portion of land to be flooded and not flooding the indigenous areas. In 1998, Eletrobrás, in conjunction with Eletronorte, requested the National Electric Energy Agency (ANEEL), the regulatory agency for energy in Brazil, to authorize, new feasibility studies of the Belo Monte HU. The agreement between the parts come in 2000 and both companies present the feasibility studies to ANEEL, which cannot conclude it due to judicial decision ordering the studies to stopped, in 2002. In the next years of the 2000s, the Brazilian National Congress by Legislative Decree authorizes Eletrobrás to finish the studies, Eletrobrás formally asks the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA), Governmental institution responsible for starting the Environmental Assessment for the project, measuring and authorizing or vetoing the project, and the National Council of Energy Policy (CNPE) decides that the only hydroelectric potential to be explored in the Xingu River will be the Belo Monte HP. In 2010, after many public hearings

held by IBAMA and public audiences in different public institutions, IBAMA grants the Preliminary License of Belo Monte Hydroelectric Plant and there is an auction to build, operate and sell the energy produced in the future in the power plant (ANEEL, no date). Only in April 2016, Belo Monte starts to generate commercial energy with its first installed turbine. In accordance to the MME, another 17 turbines are under construction, which will be completed and activated gradually until 2019, meeting its full capacity (MME, 2016).

In accordance to Fainguelernt (2016), from the very beginning, Belo Monte remained under wide resistance established by social movements, environmentalists, leaders and representatives of populations affected by the project, and was taken over as a priority by the "energy crisis" in 2001 that affected Brazil, starting the debate on power generation and energy matrix. However, notwithstanding the rising questions about the scale of the impacts of large hydroelectric plants in the Amazon region, the "hydroelectric lobby" and the interests of the large associated private contractors have not allowed a cease of the model of large dams in Brazil and, thus, the Brazilian energetic matrix still relies on the so-called "clean" modality based on the water resource.

Below, the adapted chronology of the construction of Belo Monte Hydroelectric Power Plant:

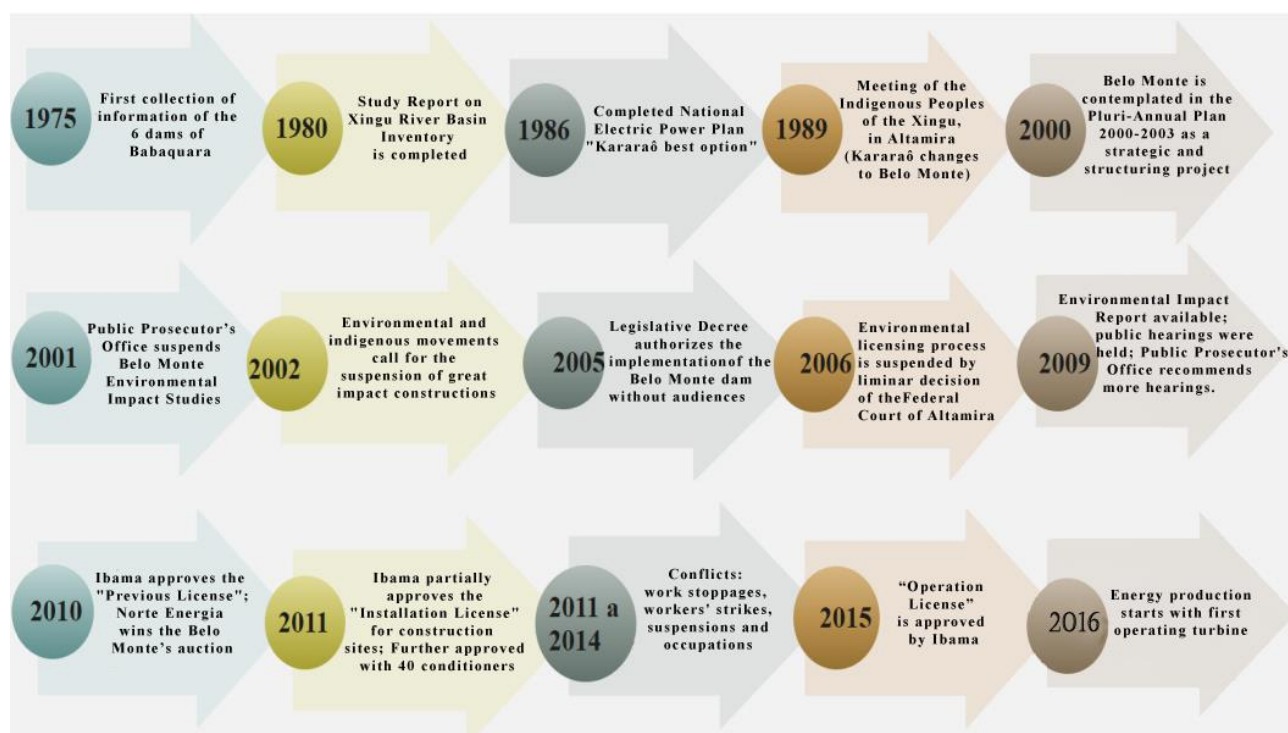


Figure 2: Adaptation and free translation of Belo Monte's construction chronology. (Silveira, 2016)

2. The different voices in the Xingu River Basin

As we could see before, the territory covering the Xingu River Basin start to suffer new dynamics of potential use since the 1970s and this "new development" approach to the area comes with

socio-economical, environmental and productive transformations. Those transformations affect directly the people historically attached to those lands and traditional (indigenous) communities, causing tension and conflicts, culturally and financially speaking. On the other hand, powerful external economic groups influence the public sector to continue investing in the “development” of the region. The capital movement “usually ignores the lived space of local communities and aim to rebuild it due to the capital accumulation” (Herrera and Moreira, 2013). The private capital together with the public sector and policies designed to the “development” of the Nation and the strategic energy sector tends to overpass the interests of minorities and local communities. Barros and Ravena (2011) points that Habermas (2003) states that the public sphere, where the qualified debate about societal themes arose, was corrupted when the notions of public and private were drawn to propaganda and simulacrum, especially taking into consideration the present commercialization of the media, distorting vital democratic instruments to the implementation of sustainable public policies that respond to social problems, such as public hearings and audiences. The authors affirm that those tools of social participation have been assimilated by the logics of politics and the media, hence used as means for political visibility, particularly considering the periods of the proximity of electoral campaigns.

Taking this in consideration, Fleury and Almeida (2013) point that the discussions around the project were “passionate” either in favor or against it, dividing the actors by these two positions. The actors in favor, according to the authors were: the government, composed of public institutions such as Eletrobrás, the Presidency of the Republic, the Ministry of Mines and Energy (MME) and its attached companies and the National Indian Foundation (FUNAI), as well as local municipalities and private contractors (after 2010, mostly the consortium that won the auction to build and operate the dam). Opposing to them, different social movements and NGO’s, with special mention to the movement “Xingu Vivo” (Xingu Alive), composed by several different societal movements and entities, the “Movimento dos Afetados por Barragens – MAB” (Movement of the Affected by Dams) and others. International actors were involved in the group against the project, as Amazon Watch and International Rivers. Family farmers, riverine and fishermen, belonging to communities directly affected by the enterprise floating between the pros and against the project: there are those resistant to change, arguing about their production and way of life and those afraid to be afraid of being run over by the changes and suddenly with the possibility to access sums of money never seen before if they accept negotiating their lands and rights with Eletrobrás. The local communities surrounding the project’s areas and the menace of gentrification coming with the real estate speculation. The Academia and scientific community with several lectures, documents, and studies about the social and environmental negative impacts

to the region. The native indigenous populations composed by several different ethnicities and each one of them with diverse discussions, interests and distinct decision-making bodies. And last but not least, the Federal Public Prosecutor's Office who, among other actions, petitioned the Inter-American Court of Human Rights against the Brazilian government demanding the immediate suspension of construction works for the Belo Monte power plant.

2.1. The Native Indigenous population and the Belo Monte Dam

Due to the construction of the Belo Monte Dam, not just the hundreds of riverine communities would be affected, but also hundreds of native communities of different ethnicities, such as the Juruna, Xikrín, Arara, Xipaia, Kuruaya, Kayapó, and others in the surrounding region (Diamond and Poirier, 2010). The authors claim that these communities would no longer be able to depend on the river for survival after the construction of the dam. Because of the retreating waters, the local communities would not be able to travel by boat to sell their produce and goods or buy staples anymore. Diamond and Poirier (2010) also point that the upstream native communities would lose migratory fish species that are essential to their diet and for several native ethnicities, the Xingu River Basin is considered a sacred soil and the starting point of civilization, making its destruction a tragedy for their culture and beliefs.

Because of the Belo Monte dam, the Kayapó people, composed of twenty-one tribes, united forces within themselves, pursuing a common goal: to stop the construction of Belo Monte. Moreover, the Kayapó's struggle led also to a union between indigenous and the "whites", NGOs, and also extended to international levels of social and environmental organizations (Turner and Fajans-Turner, 2006). The authors affirm that the Kayapós united against the "developmentalist" climate of opinion in the Brazilian government and in favor of Brazilian law, as well as human rights and environmental values.

3. Evaluation of the decision process

As stated before, the Belo Monte dam was part of a long process of evaluation by the Brazilian governmental institutions to evaluate the potential exploitation of the Xingu River Basin, in order to continue developing its energy matrix. From the 1970's until nowadays, the controversy and the duality of opinion regarding the Belo Monte project's endeavor are still open to discussion. The great efforts of the Brazilian government to advance with the Belo Monte dam is, in part, explained by the energetic matrix position and strategy chosen by the country in regard to using hydropower: about 65% of the hydropower potential in the world is concentrated in 10 countries. Brazil occupies the third position, beaten only by China and the United States (MME and EPE,

2007). Even though, in the end, the government of Brazil spared no efforts to continue the construction and implementation of the dam and started the energy production in 2016, the full power of the Belo Monte hydroelectric power plant is planned to occur only in 2019. Nevertheless, the native communities were displaced and their sacred lands were flooded.

3.1. Decision to implement Belo Monte

The Brazilian Constitution of 1988 is clear and guards an entire chapter for the Indians' rights, the chapter VIII, article 231 and its paragraphs. The article's caput states "Indians shall have their social organization, customs, languages, creeds and traditions recognized, as well as their original rights to the lands they traditionally occupy, it being incumbent upon the Union to demarcate them, protect and ensure respect for all of their property" (Brazil, 1988). Along the paragraphs, the Brazilian Constitution (1988) grants the indigenous peoples that the land they traditionally live and depends on it for subsistence are intended for their permanent possession and they shall have the exclusive usufruct of the riches of the soil, the rivers and the lakes existing therein. On paragraph 3, the Constitution says that "Hydric resources, including energetic potentials, may only be exploited, and mineral riches in Indian land may only be prospected and mined with the authorization of the National Congress".

The alternative used in the Belo Monte project was reducing the initially planned flood area of the reservoir from 1,200 square kilometers to 516 square kilometers. By reducing the area, two indigenous areas located in the region would not be flooded anymore: the Juruna Indigenous Land of Paquiçamba and the Arara Indigenous Land of Big Bend. By not directly flooding those lands, the project adequates to the hydroelectric projects in vogue by that time, disregarding the social and environmental consequences of populations not flooded or "drowned" by the formation of reservoirs. This trick allowed the project not to be subject to the provisions of paragraphs 3 and 5 of Article 231 of the Brazilian Federal Constitution, which prevents the removal of indigenous populations without prior consultation and requiring approval by the National Congress (Bermann, 2012).

Bratman points that the Brazilian government provided a large number of documents, years of studies and a socio-environmental impact assessment, but still many social movement-allied scientists contested them. She continues saying that "the government's studies have passed public scrutiny, though not without the persistence of serious contention and critique by other independent scientists" (Bratman, 2014, pg. 269). However, the construction site continues operational, despite the legal argument, protests and other activist efforts. The author cites the legal expert Bibiana Graeff that describes the Belo Monte project and construction "as one in

which ecological dimensions have frequently been trumped by economic rationales in legal decisions” (Bratman, 2014, pg. 271). Nevertheless, the popular insurgency against the construction continued and in December 2011 a petition with more than one million and three hundred and fifty thousand signatures was filed in the Office of the President of the Republic requiring the immediate interruption of the work of Belo Monte and more time to discuss the impacts of the project and its consequences within the Brazilian society. The definitive answer of the Brazilian government was "the construction will not be suspended under any circumstances" (Bermann, 2012, pg. 19).

3.2. The energy production

As stated before, Belo Monte was planned to a total amount of installed generating capacity of 11,233.1 MW, however, in reality, it is more likely to produce an average of 4,500 MW, which means less than 30% of its planned capacity, given the oscillation in water levels between the Brazilian dry and wet seasons (Bratman, 2014).

Fearnside (2009) says that dams require a lot more materials, such as cement and steel e.g., than the equivalent for fossil-fueled facilities as thermoelectric power plants. Even though the complex of Belo Monte would produce a massive amount of energy it would have a significant impact on the greenhouse effect. On the most favorable calculations for hydroelectric plants (without applying any discount rate), the author indicates that would be necessary 41 years for the complex to have a positive balance in terms of impact on global warming. The measures he considers in his studies are based on a different index for methane harmful potential for the environment and the author states that high values for these parameters would further extend the time required for Belo Monte to meet a positive balance in terms of global warming (Fearnside, 2009).

Complementing the financial feasibility and having in consideration the socio-environmental and energy production concerns, Sousa Júnior and Reid (2010) states that there is 28% chance that the Belo Monte Dam would produce a positive rate of return over the first 50 years of its operation. The authors point that the risk scenario analysis estimates a high probability of a loss for investors ranging from 3 to 8 billion American dollars.

Parameters of the analysis.			
Parameters	Units	Scenario 1	Scenario 2
Effective generation – main unit	MW	4637	3996
Turbines performance	%	92	92
Effective generation – auxiliary unit	MW	77	77
Building time	years	5	10
Lake area	Km ²	565	600
Building costs – generation	\$ x10 ⁶	3860	16,393
Operation and maintenance (O&M) costs – generation	\$ x10 ⁶	278	1182
Building costs – transmission lines	\$ x10 ⁶	1800	2732
Transmission losses	\$ x10 ⁶	55	55
O&M costs – transmission	\$ x10 ⁶	161	244
Energy price (like official bid)	\$/MWh	42	42
Energy price (free market)	\$/MWh	46	39
Annual discount rate	%	12	12
Charge factor – North region	%	80	80
Energy under regulated agreement	%	70	90
Energy on free market	%	30	10
Economic analysis time	Years	50	50

Figure 3: Parameters and scenarios – economic analysis and financial return over the years. (Sousa Júnior and Reid, 2010)

The results of the risk analysis presented by Sousa Júnior and Reid (2010) projected a 28.67% probability of feasibility among the 10.000 values calculated. In other words, the risk analysis presented by the authors displayed that there is a 72% probability that the costs of the Belo Monte dam will be greater than the benefits. Yet the risk pointed is great and big key investors kept away from the project, the Brazilian government continued investing in it.

3.3.The impact for the indigenous populations

McDowell (1996) states that the Brazilian Indian population is marginalized by a system that considers them "relatively incapable" and renders them invisible in decision-making over resource exploitation on Indian "protected lands". He continues saying that the indigenous populations are the most vulnerable group in Brazilian society and specially affected by the construction of dams, as people, way of life, and religious and cultural beliefs. Removing indigenous populations from their home and detach them from their natural resources is to separate them from the cultural and religious connection of their spirituality and cultural bond to the land, hence unraveling the tie that holds their culture together (McDowell, 1996).

In February 1989, in Altamira, Pará, occurred the 1st Meeting of the Xingu Indians, where the indigenous peoples of the Xingu basin decided to reject the Belo Monte Project together with other social movements, opposition politicians to the Brazilian government, environmental activists, and got even international visibility and support (Bermann, 2012).

In the Environmental Impact Report made by the construction companies responsible for building Belo Monte, there is very little information and concern regarding the indigenous population in that area. Among the actions to reduce impacts to those people the report cites the implementation of an "Environmental Education Project", which includes actions to train indigenous environmental agents; "Indigenous Health Program", which aimed to include actions to train indigenous health agents and another project focused on the health of indigenous women; plans for "readjustment of education", "improvement of housing" and "territorial security" for indigenous people. This same Environmental Impact Report foresees an increase in population and disorderly occupation of the soil, as well as an increase in pressure on lands and indigenous areas due to the construction of Belo Monte, also resulting in an increase in the spread of sexually transmitted diseases and other diseases not common to these native populations, besides the "greater exposure of the Indians to alcoholism, prostitution and drugs" (Norte Energia S/A, 2009, pg. 85). This report is a contradiction to itself, taking in consideration it tries to minimize the negative impacts through actions that are, in reality, measures to fix issues that will be created by the project and the indigenous populations were not facing in that time before the construction.

Bermann (2012) cites the international repercussion regarding the project. The Indigenous Missionary Council (CIMI) brought the case to the Inter-American Commission on Human Rights (IACHR), of the Organization of American States (OAS). In 2011, the IACHR submitted a document to the Brazilian government requesting the suspension of the works of Belo Monte. The author affirms that the Brazilian government answer was basically ignoring the request, replying to the Organization that "there would be no change to be made, and that all the requirements indicated in the document had already been fulfilled" and suggested the suspension of financial support for the organization (Bermann, 2012, pg. 19). Due to the absence of international constraints mechanisms has reduced the results of the initiative null and void.

4. Conclusion

After all the numbers and analysis it is clear that the Belo Monte Dam is a strategic project for the Brazilian government in charge at the moment. In the literature, it is vastly recognized as one of the most important projects within the "Growth Acceleration Program" due to the Government Lula (2003–2010) and his successor's first term, President Dilma Rousseff (2010– 2014). Due to the sum of energy it will generate, regardless the various socioenvironmental impacts and the delay in observing several mandatory legal constraints, the construction of this project continued

advancing at an accelerated pace, indicating a total neglect with the population affected (Trevisan and Ribeiro, 2016), especially the indigenous populations of the Xingu River Basin.

The Brazilian Federal government reveals that in its quest for development and safety of the national energy matrix, it could even deny indigenous peoples the smallest sum of control they have legally granted by the Federal Constitution of 1988 and as well as they should have as a result of their right to self-determination. Belo Monte was a symbol of disrespect for the indigenous rights to property, directly menacing their culture, traditions, beliefs and rights to life, intervening in their right to live in a different way in community with others, or to exercise their religious practices and even to keep united their own language (Jaichand and Sampaio, 2013). For the Brazilian state, those rights were disposable in order to continue pursuing the erection of the power plant. The indigenous peoples' procedural right to be consulted in a free, prior, and informed manner, granted by the Article 231 of the Constitution and its paragraphs have been violated. Jaichand and Sampaio (2013, pg. 446) also state that "not even during its dictatorial military regime, when the intentions to build the Belo Monte dam first became public, was the government so inflexible and disrespectful toward Brazil's indigenous peoples".

After a long process initiated in 1975, the Belo Monte finally started generating energy in April 2016, almost 5 years after the license to start its construction was granted. The project is planned to be running in "full power" in 2019. In the end prevailed the strength of the Brazilian State, despite the multiple voices against the construction of the dam. The motivation as could be seen in this report was a mix of narrowed view on energy production and national strategy to this matter (considering numbers presented in the Brazilian energy matrix and the importance of hydropower to meet the country's demands); and also a very short term view on electoral-political motivations carried by Lula's and Dilma's governments and the "Growth Acceleration Program". However, the scar of development at all costs will be open and bleeding for decades after the great social, economic, cultural, and environmental stroke in the Xingu River Basin nature and populations. The once upon a time sacred lands are now flooded. The Brazilian indigenous gods are drowned.

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