

Belo Monte: a macro view on environmental and social impacts at Pará

William Rocha M. de Oliveira^a, Laryssa Guimarães do Nascimento^b

^a Faculty of Chemical Engineering in Fluminense Federal University, Niterói, Brazil, williamrocha@id.uff.br.

^b Faculty of Law in Fluminense Federal University, Niterói, Brazil, laryssaguimaraes@id.uff.br.

Abstract: This paper aims to analyze the social and ambiental impacts which came from the construction of Belo Monte hydroelectric in Pará State, Brazil. Despite the discourse of governments authorities about the development that this hydroelectric would bring to the region, in practice, according to the literature review, other points can be demonstrated, such as the impact of Belo Monte's plant on social groups and the resettlement that they were subjected to. Moreover, the approach given by the government to the ambiental consequences and especially for the community was, still, analyzed by human rights authorities, as the Interamerican Court of Human Rights. In the article, the main points of view on the topic addressed were highlighted and explained, taking into account the motivations of each interested party. According to the point of view presented, the intention was not to solve these issues, but analyze the main points vinculated with the social groups impacted by the construction and the ambiental damages, as there is still much to be taken into account, which adds to the complexity of the subject. This demonstrated objective was to impartially show the different points opposed, thus opening precedents for questions still unanswered. In conclusion to the work, it was based on the occurrence of EIA (Ambiental Impact Study - Estudo de Impacto Ambiental) and its effort (or lack of it) to contemplating all the aspects that should be analyzed, such as the recognition of each social group affected and also the environmental areas flooded or damaged with the drought of the alteration of the river course.

Keywords: Belo Monte. Hydroelectric. Social impact. Ambiental impact. Human rights.

1. Introduction

Hydroelectric plants are a complex of works and equipment whose objective is to produce electric energy through the use of the hydraulic potential existing in a river. These structures work through the pressure exerted by the water, thus turning the turbine and transforming the potential energy into mechanical energy. This in turn, after passing through the turbine, is transformed into electrical energy by the generator.

In Brazil, this type of energy production is widely used because of the immense volume and water force contained in the rivers throughout the territory. There are 331 hydroelectric plants in the country that are divided into small hydroelectric plants (SHP) which produce from 1 to 30 MegaWatts (MW) and hydroelectric plants or hydroelectric plants with capacity from that value. This number of copies is due to the fact that Brazil is the third country in the world with the greatest hydroelectric potential [1]. Furthermore, hydroelectrics corresponds to 65,2% of Brazil's energy production, being the highest one in the country [2].

Considering this fact that majority of Brazilian energy comes from hydroelectrics and the construction of Belo Monte, inaugurated on November 27th, 2019 [3], the present paper analyzes its social and ambiental impact by literature review, dialoguing with the Environmental Impact Study. Besides, This paper is divided in three sections: the section of impacts, including ambiental and social ones, and the human rights involving the present case of Belo Monte.

2. Research Methods

The present work analyzes its social and environmental impact through a literature review, dialoguing with the Environmental Impact Study, through a comparison of results of cases that occurred in the country, bringing to light the pros and cons about the installation of the plant.

3. Belo Monte plant

The Belo Monte plant is being built in the Xingu River, near the municipality of Altamira, located in the North of Pará State. The studies for its construction began in 1975, and Pará was chosen

due to the fact that it has a great hydroelectric potential, where the largest water resources in the world are located [4], accompanied by Canada and Russia.

The project aims to build two channels that will divert the river's original path. Belo Monte will be the third largest hydroelectric plant in the world [5], the second is the Chinese Three Gorges and the first is Brazilian-Paraguayan Itaipu, located in Foz de Iguaçu [6].

While the government's view this project as fundamental for the country's energy generation, experts say that such a project is very harmful to the region's environment [7]. The Belo Monte's hydroelectric plant was projected to produce 11,233.1 MW when working at maximum capacity and 4,571 MW as average firm energy, that is, even when it has a smaller volume of water, this amount is the minimum to be reached without interruption. The reservoir planned for this generator is 503 m³ and is considered to have a low environmental impact because the Belo Monte plant is a "run-of-river" hydroelectric plant, thus being a plant that, when the water flow is small, generates less energy, hence the aforementioned variation.

4. Environmental and social impacts vinculated to Belo Monte project

The region of Altamira-PA has a great diversity of fauna and flora. The Environmental Impact Study predicts that the region is covered by 174 species of fish, 387 species of reptiles, 440 species of birds and 259 species of mammals, with some species only occurring in that region [8], group of specialists of INPA draws attention to the environmental infeasibility of the project, warning of the degrading nature of the impacts on aquatic fauna in the stretch that will be reduced in the Xingu River, harming more than 100 km of the river. It can cause irreversible loss in hundreds of species. Another major concern is the cultural issue of impacts on native indigenous populations. The Xingu River has a population of 13,000 Indians and 24 ethnic groups living on the banks of its basin [9]. The damming of the river will harm these ancient people who live there.

The project foresees that the main works were outside the indigenous territory. But even so, there is no way to avoid the environmental, social and economic impacts of the enterprise. Major deforestation is expected and major migrations are expected to intensify, occupying the territories in a disorderly manner, which will in any case have an impact on the indigenous population.

More than 100 km of river will be affected by the Reduced Flow Stretch resulting in a large reduction in water availability. The Environmental Impact Study used to validate the work closes its eyes to the reduction of the quality of this good, this issue causes major problems such as the locomotion of canoes and boats, scarcity of fishing activity and increase in the various epidemics not to mention, in the great leap in deforestation of areas other than construction, in view of the displacement of immigrants who will be removed from this construction.

4.1 Environmental impact

Despite the social impact dialogues with the environmental one, this section will present specific points, such as the effects on the biodiversity and the flooding of the region, still related with the IBAMA relatory.

One of the arguments of the Brazilian government to construct the Belo Monte plant is: reduce CO² emission. Moreover, Brazil assumed a compromise of reducing it, maintaining its emission at 36,1% and 38,9% until 2020 [10]. However, according to Fearnside [11], hydroelectrics emit methane which contributes twenty-five times more to global warming than carbon dioxide.

Besides, as reported by the Brazilian Institute of Geography and Statistics, Altamira Municipality has one of the most diverse biomes of the whole country [12]. According to Santos, Albuquerque and Corrêa, [13], EIA does not include some species that are natural from Xingu river. They understand that the hydrographic basin of Xingu has one of the highest number of species seen on Earth, it's about "4 times more than the number of species present in all Europe" [14]. Thus, this is one more omission there is on the EIA.

About the people who lived in the region that was flooded, the Urban Collective Resettlement São Joaquim in Altamira received 827 families from riverside people, traditional communities, fishermen, quilombolas and other social groups. To construct this resettlement, it was necessary to devastate 40 acre of forest, for that reason these habitations are considered as one of the resettlement with the most ambiental impact [15].

4.2 Social impact

The Belo Monte hydroelectric plant region will receive an annual financial compensation of eighty-eight million reais (R\$88,000,000.00) [16], which is equivalent to seventeen million dollars approximately. The project aims to bring an improvement to about 5,000 families residing on stilts that are located within the perimeter of the area that will be flooded [17].

A work of the magnitude of this plant requires a series of studies to prove its viability. Norte Energia SA, being the construction company responsible for the project, spared no efforts in this regard: it revised the studies on the Hydroelectric Inventory of the Xingu River, promoted the Environmental Impact Study (EIA/Rima), carried out Anthropological studies of the Indigenous Populations and also the Integrated Environment (AAI).

To discuss the construction of the plant, between 2007 and 2010, 12 public consultations were carried out; ten workshops with the community that lives in the project area; technical forums in Belém and Xingu; visits to more than four thousand families; four public hearings by the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA), with more than six thousand people; and 30 meetings of the National Indian Foundation (Funai) in indigenous villages.

Although the Environmental Impact Study, scientists alert that it did not consider all the areas which were flooded. Baines [18] presents that only the region of Volta Grande river is considered as a directly affected area, while people of Paquiçamba's Juruna, Volta Grande's Arara and the indigenous families of Xipaya, Kuruaya, Juruna, Arara, Kayapó are not considered, even the riverside community of this region [19]. Couto & Silva says that "it brings a reference on secondary data, unreliable, which don't represent the reality" [20]. According to these studies, the research made by the government about the impacts of Belo Monte is, therefore, superficial because of the fact of not including all the population that was affected by its construction [21].

If the country loses all this connection of its current society with its origins, it will certainly not be aware of itself. All this is seen as an affront to the principle of respect for the Identity, Culture and Interests of Traditional Communities and Societies Formative Groups, announced on the article 216 of the 1988's Brazilian Federal Constitution [22]. The maintenance of their culture is linked to the renewal of the people with their country, everything that concerns their origins must be preserved for the next generations.

Seventy percent of the energy from UHE Belo Monte will go to the captive market and distributors. Ten percent for self-producing companies and 20% for the free market. No industry will receive subsidized energy. There will be a change in the flow of the Xingu River in the area known as Volta Grande of Xingu, but the hydrograph proposed by the environmental impact study of the work guarantees adequate conditions for maintaining the way of life of the Juruna ethnic groups from Km 17, Arara da Volta Grande and Paquiçamba, who inhabit this area.

Another point is about people who currently live in a precarious situation, in houses or on stilts, which, in most cases, have water under the floor during the flood season and live with mud in the dry season, where children play and residents relieve themselves due to the total lack of basic sanitation, they will receive houses in urbanized locations with water, sewage and rainwater networks, schools and health units, in addition to recreation and leisure areas [23].

However, it's not in all cases that people who are moved became satisfied with the new region and structure offered [24]. Analyzing the resettlement of San Joaquim, involuntary displacement can "undo the sociocultural connection engaged with the place, structured by familiar heritage" [25].

The construction of the Belo Monte hydroelectric plant, according to sociologists, is a crime against the region's Indians, and against all Brazilians, as Brazil has its history of ethnic and cultural mixtures responsible for designing the multiple national identity, thus drawing the attention of the world for its wealth of elements and expressions [26].

5. Human rights involving the Belo Monte project

Human rights violations and illegalities in the licensing process for the Belo Monte Hydroelectric Power Plant, whose construction was authorized by the Brazilian government, were taken to the UN Human Rights Council, the highest institution of human rights body. Global Justice and the Pará Society for the Defense of Human Rights (SDDH), together with Conectas Human Rights, expressed their concern regarding the attitude of the Brazilian government to the precautionary measures requested by the Inter-American Commission on Human Rights (IACHR) of the Organization of American States (OAS), which requested the suspension of the work until the rights to prior, free and informed consultation of indigenous peoples are guaranteed [27]. The statement was made during the 17th session of the UN Human Rights Council in Geneva, Switzerland. For the human rights organizations involved in the case, by maintaining this truculent stance, Brazil tarnishes its international image and increases the political cost of Belo Monte incalculably [28].

The case of Belo Monte in the Inter-American Commission on Human Rights can be analyzed from two perspectives: international and domestic. From the first point of view, it is observed that the IACHR has innovated in its focus of action, starting to act on issues that correspond to the demands presented by the new global order. Such demands, however, not yet had been tested and legitimized in front of national governments, which possibly left the IACHR in a less favorable position in the battle in which it was involved in the face of the Brazilian government

when editing a MC-382/10. From the second point of view, it is observed that, considering the variety of interests involved in the Belo Monte case, the Brazilian government, with the approval of the National Congress, decided to proceed with the Belo Monte hydroelectric plant project. In this regard, it is worth mentioning that, despite the costs involved in this decision, and after intense political debate, the option adopted was for the continuation of the works.

In addition, another point that deserves greater attention is the strength that Brazil has recently acquired in the global arena, which left it much less subject to the influence of international agents and, consequently, strengthened the fight in which it was involved against the IACHR. It is not surprising, therefore, that the IACHR's decision to issue MC-382/10, asking the Brazilian government to immediately suspend the Belo Monte works, has led the Brazilian government to adopt a divergent stance from the IACHR's actions.

The next moment, when reviewing its decision and reversing the request made to the Brazilian government, the IACHR recognizes the government's decision to proceed with the Belo Monte works, but signals that it will continue to monitor the strict protection of the human rights of the communities affected by the construction. This new position adopted after the revocation of MC-382/10, of surveillance and not of control, allows the IACHR to continue dialoguing with the Brazilian government and, more importantly, will enable the monitoring of works and international supervision regarding the protection of rights human rights of the people affected by the work. Although the IACHR now adopts a less radical and less ambitious stance, the change in strategy makes it easier for the Brazilian government to react towards convergence with the Inter-American System for the Protection of Human Rights.

6. Conclusion

The clash between the various prisms that surround this work is remarkable. Belo Monte is, in fact, a grandiose project and because of its condition, the most diverse discussions arise. In this exemplary work, the main points of view on the subject addressed were highlighted and explained, taking into account the motivations of each interested party. As the point of view presented, the intention was not to resolve these issues, as there is still much to be taken into account, what gives the complexity of the subject. The objective here was to impartially show the different contraverted points, thus opening precedents for questions still unanswered. It is evident, therefore, that the Belo Monte project is extremely complex and should be treated with such mode. Reductions in earnings and energy efficiency make the debate simplistic and therefore an holistic and dynamic approach should be adopted. As

analyzed, the construction of this hydroelectric promoted more social and ambiental impact than was expected on the Environmental Impact Study (EIA/Rima). Even the director of Aneel (National Agency of Electric Energy) declared that every aspect was considered [29], in practice, according to Alves, Santos, Albuquerque and Corrêa [30] it occurred because EIA didn't include all the aspects that should be analyzed, such as recognizing every social group that was affected and also the ambiental areas that was flooded or damaged with the dry from the the river course alteration.

Nowadays, with the end of construction and the total installation and operation of Belo Monte's Plant, people continue to deal with the impacts to which they were subjected, as well as the environmental consequences arising from this construction, aggravated by the pandemic, given by the increase of deforested area at entire Amazon region, including the one where the Plant is located, based on the government policy expressly stated by the ex-Minister of the Environment as "passing the herd" [31].

7. References

- [1] Luiz. J. Hydroelectric Power Plant. *Informal Dictionary*. Recovered on March 07th, 2022, from <http://www.dicionarioinformal.com.br/usina%20hidrel%C3%A9trica>.
- [2] Energy Research Company (EPE). *Matriz energética e elétrica*. Recovered on April 10th, 2022, from <https://www.epe.gov.br/pt/abcdenergia/matriz-energetica-e-eletrica>.
- [3] NORTE ENERGIA S.A. *História de Belo Monte - Cronologia*. Recovered on April 10h, 2022, from <https://www.norteenergiasa.com.br/pt-br/uhe-belo-monte/historico>.
- [4] Borges, F. Q., Zouain, D. M. A matriz elétrica no Estado do Pará e seu posicionamento na promoção do desenvolvimento sustentável. *Revista Planejamento e Políticas Públicas*, n. 35, jul/dez, 2010, 189 p. Recovered on April 10th, 2022, from http://repositorio.ipea.gov.br/bitstream/11058/3992/6/PPP_n35_Matriz.pdf.
- [5] Santos, T., Santos, L., Albuquerque, R., Corrêa, E. Belo Monte: Impactos sociais, ambientais, econômicos e políticos. *Tendências*, 13 (2), 2012, 214-227 p. Recovered on April 02nd, 2022, from <https://revistas.udenar.edu.co/index.php/rtend/article/view/479>.
- [6] Castro, J N., Rosental R., *Integration and Electric Energy Security in Latin America*, 1st edition, Ed. Oficina de livros, 2017, 255p.
- [7] Castro, J N., Rosental R., *Integration and Electric Energy Security in Latin America*, 1st edition, Ed. Oficina de livros, 2017, 255p.

- [8] Ritter, C.D., McCrate, G., Nilsson R.H., Fearnside, P. M., Palme U., Antonelli A. Environmental impact assessment in Brazilian Amazonia: Challenges and prospects to assess biodiversity, *Biological Conservation* 206, 2017, 161–168p.
- [9] Ritter, C.D., McCrate, G., Nilsson R.H., Fearnside, P. M., Palme U., Antonelli A., Environmental impact assessment in Brazilian Amazonia: Challenges and prospects to assess biodiversity, *Biological Conservation* 206, 2017, 161–168p.
- [10] Santos, T., Santos, L., Albuquerque, R., Corrêa, E. Belo Monte: Impactos sociais, ambientais, econômicos e políticos. *Tendências*, v. 13, n. 2, 2012, 214-227 p. Recovered on April 02nd, 2022, from <https://revistas.udenar.edu.co/index.php/rtend/article/view/479>.
- [11] Fearnside, P. M. O Novo EIA-RIMA da Hidrelétrica de Belo Monte: Justificativas Goela Abaixo. In: *Painel de Especialistas - Análise Crítica do Estudo de Impacto Ambiental do Aproveitamento Hidrelétrico de Belo Monte. International Rivers*, 2009, 108-117 p.
- [12] Brazilian Institute of Geography and Statistics (IBGE). *Estimativas da população residente no Brasil e unidades da federação com data de referência em 1º de julho de 2017*. Recovered on 07th April, 2022, from <https://ww2.ibge.gov.br/home/estatistica/populacao/estimativa2017/default.shtm>.
- [13] Santos, T., Santos, L., Albuquerque, R., Corrêa, E. Belo Monte: Impactos sociais, ambientais, econômicos e políticos. *Tendências*, v. 13, n. 2, 2012, 214-227 p. Recovered on April 02nd, 2022, from <https://revistas.udenar.edu.co/index.php/rtend/article/view/479>.
- [14] Santos, T., Santos, L., Albuquerque, R., Corrêa, E. Belo Monte: Impactos sociais, ambientais, econômicos e políticos. *Tendências*, v. 13, n. 2, 2012, 214-227 p. Recovered on April 02nd, 2022, from <https://revistas.udenar.edu.co/index.php/rtend/article/view/479>.
- [15] Alves, L. S., Hage, S. N. S., Júnior, A. P. A Usina Hidrelétrica de Belo Monte (Altamira, Estado do Pará, Norte do Brasil), o reassentamento urbano coletivo e a avaliação dos impactos ambientais. *Revista Brasileira de Gestão Ambiental e Sustentabilidade*, v. 5, n. 9, 2018, 49-74 p.
- [16] Ministry of Mines and Energy (MME). (2017) Recovered on April 14th, 2022, from <https://www.gov.br/mme/pt-br>.
- [17] Ministry of Mines and Energy (MME) (2017). Recovered on April 14th, 2022, from <https://www.gov.br/mme/pt-br>.
- [18] Baines, S. G. (2009). O EIA-RIMA da Usina Hidrelétrica Belo Monte e as Populações Indígenas. In: *Painel de Especialistas - Análise Crítica do Estudo de Impacto Ambiental do Aproveitamento Hidrelétrico de Belo Monte. International Rivers*, 2009, pp. 70-74.
- [19] Baines, S. G. O EIA-RIMA da Usina Hidrelétrica Belo Monte e as Populações Indígenas. In: *Painel de Especialistas - Análise Crítica do Estudo de Impacto Ambiental do Aproveitamento Hidrelétrico de Belo Monte. International Rivers*, 2009, pp. 70-74.
- [20] Baines, S. G. (2009). O EIA-RIMA da Usina Hidrelétrica Belo Monte e as Populações Indígenas. In: *Painel de Especialistas - Análise Crítica do Estudo de Impacto Ambiental do Aproveitamento Hidrelétrico de Belo Monte. International Rivers*, 2009, pp. 70-74.
- [21] Couto, R. C. de S.; Silva, J. M. da. As questões de saúde no estudo de impacto ambiental do Aproveitamento Hidroelétrico Belo Monte. In: *Painel de Especialistas: Análise Crítica do Estudo de Impacto Ambiental do Aproveitamento Hidrelétrico de Belo Monte, International Rivers*, 2009, pp. 81-90.
- [22] Federal Constitution (1988). Constitution of the Federative Republic of Brazil. Brasília, DF, Senado, 1988. Recovered on March 7th, 2022, from http://www.planalto.gov.br/ccivil_03/constituicao/constituicaocompilado.htm.
- [23] United Nations. 11 - Sustainable cities and communities. Make cities and human settlements inclusive, safe, resilient and sustainable. Recovered on April 14th, 2022, on https://www.un.org/sustainabledevelopment/wp-content/uploads/2020/07/E_infographics_11.pdf.
- [24] Alves, L. S., Hage, S. N. S., Júnior, A. P. A Usina Hidrelétrica de Belo Monte (Altamira, Estado do Pará, Norte do Brasil), o reassentamento urbano coletivo e a avaliação dos impactos ambientais. *Revista Brasileira de Gestão Ambiental e Sustentabilidade*, v. 5, n. 9, 2018, 49-74 p.
- [25] Alves, L. S., Hage, S. N. S., Júnior, A. P. A Usina Hidrelétrica de Belo Monte (Altamira, Estado do Pará, Norte do Brasil), o reassentamento urbano coletivo e a avaliação dos impactos ambientais. *Revista Brasileira de Gestão Ambiental e Sustentabilidade*, v. 5, n. 9, 2018, 49-74 p.
- [26] Rodrigues, C. C., *Brazilian identities - composition and recompositions*. 1st edition. Ed. Cultura Acadêmica. 274 p.
- [27] CONJUR. *OEA pede que Brasil suspenda obras de Belo Monte*. Recovered on April 10th, 2022, from <https://www.conjur.com.br/2011-abr-05/oea-brasil-suspenda-obras-belo-monte-protoger-indigenas>.
- [28] MEHL, G. Questão de Belo Monte é levada ao Conselho de Direitos Humanos da ONU. *Justiça Global*. Recovered on March 12th, 2022, from <http://www.global.org.br/blog/questao-de-belo-monte-e-levada-ao-conselho-de-direitos-humanos-da-onu/>.

[29] CONJUR. *OEA pede que Brasil suspenda obras de Belo Monte*. Recovered on April 10th, 2022, from <https://www.conjur.com.br/2011-abr-05/oea-brasil-suspenda-obras-belo-monte-protoger-indigenas>.

[30] Santos, T., Santos, L., Albuquerque, R., Corrêa, E. Belo Monte: Impactos sociais, ambientais, econômicos e políticos. *Tendências*, v. 13, n. 2, 2012, 214-227 p. Recovered on April 02nd, 2022, from <https://revistas.udenar.edu.co/index.php/rtend/article/view/479>.

[31] G1. *Ministro do Meio Ambiente defende passar 'a boiada' e mudar regras enquanto atenção da mídia está voltada para a Covid-19*. Recovered on April 10h, 2022, from <https://g1.globo.com/politica/noticia/2020/05/22/ministro-do-meio-ambiente-defende-passar-a-boiada-e-mudar-regramento-e-simplificar-normas.ghtml>.