Experts Panel Assesses Belo Monte Dam Viability
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The Experts Panel is comprised of volunteer researchers, and was formed in response to a request by social movements in the region of Altamira, Pará, Brazilian Amazon that would be affected by the Belo Monte Dam. It was made possible by support from the Fundação Viver, Produzir e Preservar of Altamira, WWF Brasil, Instituto Sócio Ambiental, International Rivers, FASE and the Rede de Justiça Ambiental.

In its current configuration, the Belo Monte hydroelectric project represents the imposition of civil engineering works on a monument of biodiversity – the Big Bend of the Xingu River – where the river would be carved up, two canals each 12 km long and up to 500 meters wide would be built, in addition to another canal 8 km long cutting off and interrupting the flow of many important creeks, and a group of 28 dykes, in reality each a large dam 50-60 meters high, and in total 1 km in length with lateral sections of up to 80-100 m – which will extend to rural areas and connecting roads of the Transamazon Highway. This group of walls is designed to prevent the escape of water to the original bed of the Xingu, in order to maintain a flow to the main power house near the ferry that crosses the Xingu along the Transamazon. The quantity of earth, rocks, and excavation that would be necessary are on the scale of 200 million m^3 that was needed to build the Panama Canal. At an under-estimated cost of US$ 6 billion, with estimates in the media exceeding US$ 17 billion, the project would have an installed capacity of about 11,200 MW and "firm" energy of about 4,400 MW.

The Belo Monte project is perhaps the most complicated engineering work in the history of Brazilian dam building. This complexity has resulted over the past two decades in an enormous set of conceptual and technical problems, omissions, and confusion. It is difficult to understand the Belo Monte EIA unless you look at the history of this project, and how it has been reshaped over time, since the initial hydroelectric surveys on the Xingu River in the 1980's, to the proposals for various dams on the Xingu and its tributary, the Iriri. In the 1980's this project was symbolically defeated by the indigenous woman Tuíra's passing her machete over the face of José Muniz Lopes, then an engineer and today the president of Eletrobrás.

A reading of the EIA shows that project proponents attempt to elevate the quality of the proposed project, based on hiding its grave consequences and on attempting to repair technical problems in the previous project – it is more than 35 volumes, more than 20,000 pages.

The work entitled: *EXPERTS PANEL: A Critical Analysis of the*

Environmental Impact Studies for the Belo Monte Hydroelectric Dam is a collection of analyses signed by 28 researchers, part of a group of 42 researchers from various Brazilian universities and research institutions, and some abroad. This group of analyses was officially registered on October 1, 2009 in the office of Ibama (Brazilian environmental licensing agency) in Belém, Pará (PA/Protocolo 02018.005622/09-72) as well as with the Federal Attorney's office in Altamira.

Among the themes analyzed are the economic viability of the project, the impacts of its construction over an extension of 100 km2, impacts on indigenous populations, the social chaos that would be caused by the forced relocation of 20,000 people and by the migration of more than 100,000 people to the region, impacts on fish and aquatic species, the possibility of species extinction, emission of large quantities of greenhouse gases, impacts on water and food availability, and others. All these impacts are more serious given that numbers of people affected and the size of the area affected by the project are underestimated.

One of the most sensitive and unique aspects of this project is the carving up of the Xingu River at the Pimentel Island, which will leave the stretch of the river called the Big Bend (about 100 km) with its flow drastically reduced to as little as 700m^3/s. *Jorge Molina Carpio,* hydrologist, basing his findings on data from the EIA and on his own simulations, found there will be severe decreases in the levels of this sectioned stretch of the river and a drastic decline in the water table, as well as a lowering of water levels of up to five meters in the stretch between the proposed Pimentel Dam and the mouth of the Bacajá River.

Upstream at the city of Altamira, the effects would be the inverse, the water table would rise, increasing the risks of pools of water forming in the city. *Molina's* hydrological studies reveal serious omissions in the EIA: the lack of simulation and evaluation of water levels downstream from Pimentel Dam; insufficient studies of sedimentation, and lack of analysis on the rising of the water table.

The Environmental Impact Report (RIMA) distributed at public hearings does not help to clarify information on the project impacts to the general public. It does not reference places known to the public. *Henri Acselrad*, professor at the Institute for Urban and Regional Research and Planning (IPPUR) comments that the term "sustainability" used in the RIMA refers principally to the sustainability of the dam project itself, rather than the sustainability of the ways of life of populations threatened by the dam.

Philip Fearnside, of INPA/Manaus, points out that the analysis of Belo

Monte should not be disassociated from the idea of future dams on the Xingu River, which would be able to regulate the river flow, providing a sufficient volume of water to permit the exploitation of the installed generating capacity year-round and reduce the gap between capacity and the amount of energy which would actually be generated.

The contribution of studies on fish reveals that the proposed artificial flow – paradoxically called "ecological hydrogram" – will not be capable of maintaining species diversity and will not come close to simulating the natural dynamic of the river. The volumes and levels of water would compromise the maintenance of the flooded forest and the dynamic of the waters by which species evolved to form the exuberant biodiversity of the Big Bend.

The project's unprecedented energy ineffiiciency and the accelerated and forced process of public hearings show that the government and construction companies intend to build a huge project do matter what the cost. The Panel, as citizens, alerts the government and the population regarding this grave mistake, whose real costs are still unknown.

Omissions and mistakes in the analysis of situations and social, economic, and cultural data

The *Panel* identified diverse omissions and mistakes in the project environmental impact studies, which impede conclusive analyses on key themes.

Sonia Magalhães, Rosa Acevedo and *Edna Castro* emphasize that the EIA does not reflect current practices in the social sciences for interpreting social diversity. "The EIA underestimates the population living in the rural area and distorts the most elementary data which characterize the population, including the population that is economically active, professions, and pyramid of age. The median of 3.14 people per household is a serious mistake derived from a confused methodology. The median is really, according to what data indicate and what the bibliography shows 5.5 to 7 people per household. This, at the minimum could double the number of people directly affected. Only through new studies could this be confirmed".

The government says that it created the project design in order to avoid flooding indigenous lands, but in this case, diverting more than 80% of the stream flow of the Xingu will directly affect indigenous people. Despite the fact they are protected by guarantees of their rights in the Brazilian constitution, they are not among those considered "directly affected" by the project.

There is an under-counting of the egional economy, since the studies

do not include an analysis of production and commercial flows of agroforestry systems, which historically sustain the internal market and exchange with external markets. The EIA lacks elements which would permit the project's impacts on this economy. Specifically, in the region downstream from the principal dam (called the Stretch of Reduced Stream flow), there is no analysis regarding its social, economic, and cultural importance, nor any evaluation of potential losses.

According to *Nirvia Ravena,* professor at the Federal University of Pará (UFPA), "As it is taken away, water and food security becomes a violated right, and since it is never mentioned there is no way to detect it in the studies. To compromise with such intensity the way of life of these populations make the hydroelectric project unviable. And not even presenting the problem is a way of making it disappear and in this way attempt to fool the justice system so that they do not observe the violation of rights". How, then, can one minimize this question of water and food insecurity and human rights violations? Simply but not speaking of these rights.

Diana Antonaz and *Alexandre Cunha*, professors at the UFPA and *Cecília Mello*, of the Brazilian Environmental Justice Network, sound an alert in their reports regarding the inadequacy of the concept used in the EIA to determine affected populations and that the socio-cultural complexity of the affected population is reduced to the categories of various types of property owners or non-owners, and to people whose land will be flooded or not. The failure of the EIA to explain the methodology used in the analysis makes it impossible to support the EIA's conclusions.

Indigenous Peoples: A disaster announced, pronouncement of rights violated

According to *Antonio Carlos Magalhães*, an anthropologist who has carried out research in the region for decades, the Big Bend of the Xingu is considered by the project proponents as being within the "Area Directly Affected". Despite this fact, the indigenous peoples Juruna of Paquiçamba, Arara da Volta Grande, and indigenous families of the Xipaya, Kuruaya, Juruna, Arara, Kayapó ethnic groups, as well as the river bank dwellers in general who live in diverse localities (Garimpo do Galo, Ilha da Fazenda, Ressaca, etc.,) are not considered to be directly affected. The project will modify the stream flow of the Xingu River and its tributaries in this stretch causing a permanent dry season, with a decline in the water table, changes in navigability of the river, an important loss of aquatic and terrestrial fauna, a shortage of water and other effects. This

means the indigenous peoples will lose their natural resources, including water resources, with direct impacts on their livelihood.

All the principal engineering works will be near indigenous lands, which will be subjected to their physical impacts and, above all, the social and cultural impacts that will result from their nearness to the work sites, and to the flux of workers and jobseekers. So, why are they not considered "directly affected"?

Stephen Baines, anthropologist, Professor at the University of Brasília says: the project's proposal is to bribe the indigenous people will mitigation programs and compensation instead of giving them an equal voice regarding the project and treating them as people whose rights should be respected, including their right to not accept large hydroelectric projects on their lands.

Health risks

According to the entomologist *Inocêncio Gorayeb*, of the Emilio Goeldi Museum, the Belo Monte project will cause drastic and extensive alterations to the environment and its consequences will surely be much greater than those predicted in the RIMA. Extensive areas of the river and its banks will be flooded by the formation of the reservoir upstream as well as in the area of the drainage canals. Downstream another area will suffer an inverse process, and will be transformed into a regime of drought. It is impossible to know what species of insects will respond by becoming overpopulated, but if vectors of malaria are increased, the problem will be more serious. The increase in the migrant human population, which is more vulnerable, and the intense local migrations of people will help contribute to huge increases in the populations of insects and the lack of control over the spread of disease.

According to *José Marcos da SILVA* and *Rosa Carmina*, a public health expert, the Belo Monte EIA did not include a situational health diagnostic of the reference population for the project. There is one reference and secondary data which are unreliable, because they do not effectively represent reality. This could have been resolved if the diagnostic had used a methodology of epidemiological studies in the area of influence with community participation. Lacking this, it does not go deeply into social questions, and the relationship between the environmental impacts and community and worker health.

Vera Gomes, professor at the UFPA, alerts that the additional basic health care suggested in the EIUA is absolutely insufficient: attention to health problems cannot be limited to primary care, and there will also have to be

attention paid to increasing the capacity of emergency health care and specialists including: neurologists, cardiologists, urologists, and others which are already in short supply in the affected municipalities.

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Technical and Economic Viability Unproven

According to *Francisco Hernandez*, an electrical engineer and one of the Panel's coordinators, it is now clearer that "the Belo Monte project has dubious viability, from the point-of-view of its engineering, being an extremeley complex project that simultaneously causes flooding while also drastically reducing the availability of water along 100 km of the Big Bend of the Xingu which bathes many communities and two indigenous reserves. The damming would alter the seasonal dynamic of the Big Bend, an exuberant stage of Amazonian biodiversity which evolved as a result of this dynamic of its waters, being an impressive fluvial monument. The project depends on the construction of not only one dam, but in fact of a series of large dams and dykes that will interrupt the flow of waters in an enormous area, requiring the moving of earth and rocks with volumes on the order of those excavated for construction of the Panama Canal. Hernandez says that Belo Monte would generate little energy during the three-to-four-month low water period. One must ask: Does this justify an investment estimated at between US$ 7 and US$ 9 billion by the government or more than $17 billion, according to private investors, given the enormous devastation the project would cause?

Wilson Cabral, of the Department of Infrastructure of ITA, uses simulations which, taking into account the finding of the Panel that the consequences of Belo Monte are under-estimated, in addition to the likelihood that official budget figures for construction are under-estimated, added to the fact that mitigation plans and projects are still undefined (only generically mentioned in the EIA), finds it doubtful that the project would be economically feasible, especially not if immense "externalities" were to be factored into calculations.

Philip Fearnside, a leading authority on greenhouse gas emissions of hydroelectric dams comments: Hydroelectric dams emit methane, a greenhouse gas 25 times more potent in terms of global warming than carbon dioxide, according to current conversions used by the Intergovernmental Panel on Climate Change. The Belo Monte EIA omits any reference to studies which have become scientifically approved and does not include information about this consequence.

Prof. *Oswaldo Seva*, of the University of Campinas who has

studied the consequences of dam projects proposed for the Xingu, says that "Logic dictates that those affected by the "drying" of the river and the water table be considered just as affected as those whose land and belongings are flooded. Ethics demands that all those who would suffer losses as a result of dam construction be considered as affectred. In this case, the official number of a little more than 19,000 people affected is clearly unreal. A list of the underestimations of consequences simply testifies to the fact that the project should be abandoned.

Jorge Molina, hydrologist, coments that "The EIA does not include an analysis of the lowering of water levels in the Xingu River and of its seasonal fluctuation as a consequence of decreasing its stream flow". Molina says "Without a deeper analysis of the consequences of the reduction of water levels in the entire stretch of the Big Bend, it is impossible to come to conclusions regarding the magnitude of the impacts in this stretch or even to affirm whether or not the hydrogram for the stretch of reduced flow is consistent".

Geraldo Mendes dos Santos, of INPA, and one of the top authorities in Amazon fish species alerts "The maximum value that will be pemitted to pass the dam to the Stretch of Reduced Flow will be only 8,000m^3/s and it should be remembered that this is only one-third of the natural flood stage of the Xingu River, which is about 23,000m^3/s. This means that the Stretch of Reduced Flow will never have the natural conditions that now exist and under which the plants and animals of this region developed. Certainly, the groups of species that live in this stretch of the river will not survive under a flow regime imposed by decree or administrative norm, whether these come from the government, from the companies, or even from science.

As for aquatic mammals, Mendes dos Santos points out: "The most noteworthy fact about aquatic mammals is that the EIA treats these in only a descriptive manner, on the basis of the literature and collection data. There is not even a single paragraph regarding the impacts the dam will have on them, nor on the environment in which they live. This is a grave omission that must be corrected".

Threats to biodiversity

The group of ichthyologists, *Janice Cunha, Flávio C. T. de Lima, Jansen A. S. Zuanon, José Luís O. Birindelli, and Paulo Andreas Buckup,* president of the Brazilian Ichthyology Society, alerts that the determination of the irreversible character of the impacts on fish in the Stretch of Reduced Flow leads to the technical conclusion that Belo Monte Dam, from the point of view of icthyofauna is technically

unviable, seeing that it will destroy a great extension of environment of rapids both in the Big Bend and in the reservoir region. There is no environmental compensation for this level of impacts on icthyofauna. This stretch of the Xingu River is formed by a series of channels, rapids, and unique habitats that will lose their functionality. The reduced stream flow will cause the death of millions of fish along 100 km or more of the Big Bend and there is no measure that can be taken to mitigate or compensate for this impact.

Furthermore, the EIA makes obvious errors in identifying the species present in the river.

Hermes Medeiros, a doctor in ecology and professor at the UFPA coments: “The Xingu River basin is one of the richest in fish species that has been observed on this planet, with about four times the total amount of species found in all Europe. This biodiversity is in large part a result of the geographic barrier of the rapids and rock outcroppings of the Big Bend which divide the aquatic environments of the Xingu River into two distinct ecoregions. The system of navigation locks and fish passage proposed could break this isolation, causing extinction of hundreds of species, in addition to unforeseeable socio-economic impacts, including ones which affect the viability of the dam itself, being processes which once detected cannot be reversed or controlled.

“The EIA presents models of deforestation in the past, but lacks estimates for the future, which is possible to do by applying methods of simulation that are widely used today. It is noteworthy that this project’s impacts on deforestation are not spacially defined only by the area of the reservoir, and their extent can only be defined after these analyses. Future scenarios should be analyzed, with or without dams, modeling migratory fluxes”. And “In the EIA there is an inconsistency between what is discussed by specialists on terrestrial ecosystems, who assume that the flooded forests will be lost, and the disregard for these effects in the proposition of conservation units as compensation mechanisms, as well as in the determination that the local populations are not directly affected”.

Brazil doesn’t need Belo Monte – a project full of problems – which should be abandoned, according to *Hernandez* and *Fearnside*. The project would serve primarily to furnish energy for electro-intensive industries which are being constructed or are in expansion in the region, rather than to supply the national market, seeing that the transmission connections have still not been defined.

The operative inefficiency of Belo Monte opens possibilities for future dams on the Xingu. The indices of area flooded are presented as "environmentally better" than other hydroelectric dams without factoring in the project's environmental consequences and thus they should not be applied: they do not take into account the drastic decrease in flow in the Big Bend. The area for calculating the environmental index should at least include the two indigenous territories – that of the Paquiçamba and the Arara do Maia reserves and, at the very least, should consider this affected area to be 1522 km^2, including the entire stretch that would become dried out.

Brazil is resisting the energy transition that is taking place today on the global level, including that of questioning the viability of large dams. Brazil, in terms of energy planning, bases its energy policy only on supply and does not question or deepen its analysis regarding energy demand. This offer of energy becomes a sign of an arrangement between the government's planning and the market. There are consequences in this: the country prefers to destroy its natural wealth and expel those populations living on the river banks in order to favor distinct corporate and political interests.

In summary, The *Panel* observes:

<u>On the Belo Monte EIA:</u>

- Methodological inconsistencies;
- The absence of adequate and consistent bibliographic references;
- Absence of and errors in the data;
- Unsystematic collection and classification of species, with risks for knowledge and classification of local biodiversity;
- Correlations which lead to errors or doubtful interpretations;
- Utilization of rhetoric to hide impacts.

<u>On its impacts:</u>

- Underestimates of "area directly affected";
- Underestimates of "affected population";
- Underestimates of loss of biodiversity;
- Underestimates of forced relocation in rural and urban area;
- Denial of impacts downstream from principal dam and power house;
- Negligence in evaluation of health risks;
- Negligence in evaluation of risks to water security;
- Over-estimation of energy generation;
- Underestimates of social, environmental, and economic costs of the project.

The *Experts Panel,* above all, wishes to call attention to the rhetoric regarding the impacts in the Big Bend, called the "Stretch of Reduced Flow", which conceals,

among other things, the fact that indigenous territories – Juruna do Paquiçamba and Arara da Volta Grande – are “directly affected” by the project, in addition to communities of the Juruna, Arara, Xipaya, Kuruaya, and Kayapó who have traditionally inhabitated the banks of this stretch of the Xingu.

Researchers who became immersed in studying the Belo Monte EIA day and night wish to spur a public debate by demonstrating the extremely grave environmental and social consequences the project would cause. This public debate should be based upon seriousness and citizenship, showing to society that this project should be abandoned.

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