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The Jirau Dam's proposal for carbon credit: Comments on official assessment report

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JIRAU AND THE CDM

The Clean Development Mechanism (CDM) of the Kyoto Protocol is intended to provide a means by which projects in developing countries can be funded through the sale of carbon credits to developed countries (Annex I countries), thus allowing the developed countries to meet their Kyoto Protocol emission quotas (assigned amounts) more cheaply while at the same time helping the developing countries to achieve "sustainable development." One of the most controversial parts of the CDM has been projects for hydroelectric dams, especially in tropical areas like Brazilian Amazonia (*e.g.*, Fearnside, 2005; Fearnside & Pueyo, 2012). With the CDM Executive Board's approval of a CDM project for the Jirau Dam on the Madeira River in Brazil, this dam became the single largest "renewable" energy project ever approved (Thomson-Reuters Point Carbon, 2013). The registration is effective retroactively to 26 December 2012, thus allowing the project to sell carbon credit to the European Emission Trading Scheme (EU ETS) (GDF Suez, 2013).

The Madeira River Dams (Jirau and the adjacent Santo Antônio Dam) are both now nearing completion. They have, for many years, been the subject of intense opposition by groups concerned with the environment and human rights (see Switkes, 2008). These dams would certainly not be considered to represent "sustainable development" by most people's understanding of that very flexible term, but the Kyoto Protocol's requirement that all CDM projects contribute to sustainable development (UN-FCCC, 1997, Article 12, Paragraph 2) has been effectively neutralized by a decision that each country decides for itself what sustainable development is, and any project submitted to the CDM by the host county's Designated National Authority (DNA) is automatically assumed to represent sustainable development. The Jirau project has now passed through the various steps in the CDM's approval process, culminating with the submission of an "official assessment report" (Locher *et al*., 2013) on 17 May 2013, and immediate approval of the project by the CDM Executive Board. An examination of the report reveals the inability of the current project evaluation system of the CDM to prevent approval of projects that contradict the overall purpose of the Kyoto Protocol and the United Nations Framework Convention on Climate Change (UN-FCCC) by doing harm to global climate, in addition to causing notable social and environmental impacts in the host country (and in this case in two neighboring countries as well).

THE ASSESSMENT REPORT

The assessment was led by Helen Locher of Tasmania Hydro in Australia with a team consisting of two staff members from the International Hydropower Association (IHA) in London, a consultant from Sweden and another from Germany. Apparently none spoke

Portuguese, but they were accompanied throughout their eight-day "assignment" (20-28 September 2012) by staff from the client (the consortium building the Jirau Dam: Energia Sustentável do Brasil, led by GDF Suez of France).

The report is remarkable in its stressing of positive features of the social and environmental effects of the dam. The report states that "interviews with representatives of project-affected communities indicate that issues raised are taken into consideration in a thorough and timely manner" (p. 62), that "interviewees including resettled people broadly agreed that resettlement has been and is being treated in a fair and equitable manner, with some stating that the process has been conducted well" (p. 72), and that "indigenous leaders and community meetings are informed on the project (for example a group of indigenous leaders have been provided with a tour of the construction site) and the support program" (p. 76).

The report does not mention the significant number of local residents who hold views diametrically opposed to these, such as members of grassroots groups like the Living Madeira River Institute (Instituto Rio Madeira Vivo: http://www.institutomadeiravivo.org/), the Living Rivers Coalition (Coalição Rios Vivos: http://www.riosvivos.org.br), the Association for Ethno-Environmental Defense (Associação de Defesa Etno Ambiental: http://www.kaninde.org.br) and the Movement of Dam-Affected People, or MAB (Movimento dos Atingidos por Barragens: http://www.mabnacional.org.br/). Various statements by people being displaced can be seen in a video on the MAB website (http://www.mabnacional.org.br/noticia/vozes-do-madeira-retrata-luta-dos-atingidos-por-santo-antonio-e-jirau-assista). The information sources in the report are essentially limited to the project proponents, and the document does not site any scientific or other literature.

The consultants have followed a protocol from the International Hydropower Association (an industry group) that specifies a list of items for evaluation (protocol available at: http://www.hydrosustainability.org/Protocol/Documents.aspx). Not included in this list (and in the report) is the question of whether the project is "additional" as claimed by the Project Design Document (PDD) (ESBR & GDF Suez, 2012), meaning whether it would only be built because of the funds to be earned by selling carbon credits. This is essential, since if the dam would have been built anyway then the carbon credits would allow the purchasing countries to emit more greenhouse gases without this being offset by a real reduction in emissions from the hydroelectric project. Surely this unmentioned "elephant in the room" should be the primary concern to be carefully pondered by the Clean Development Mechanism (CDM) Executive Board in deciding whether to register the project, which occurred on the same day (17 May 2013) that the 202-page consultant report was submitted to the Board.

The report gives high scores for almost all of the 20 criteria considered. Eleven criteria receive the top score of 5: Governance, Infrastructure safety, Financial viability, Project benefits, Cultural heritage, Public health, Erosion and sedimentation, Water quality, Waste, noise and air quality, Reservoir preparation and filling, and Downstream flow regime. Seven criteria receive the near-perfect score of 4: Communications and consultation, Environmental and social issues management, Integrated project management, Procurement, Project-affected communities and livelihoods, Indigenous peoples, and Labor and working conditions. Only two receive low scores: 3 for Biodiversity and invasive species and 4 for Resettlement.

The way that ratings on different items are computed is sometimes surprising, usually giving more positive marks to the project than what one might expect. The high score for labor and

working conditions jumps to mind, given the multiple strikes and two major labor riots at Jirau (March 2011 and March 2012) that have made the project stand out among all of the hundreds of projects in Brazil's Program for the Advancement of Growth (PAC). The report endorses the official view of the Jirau riots as the work of a few outside agitators (p. 81). Journalists granted access to the site in the aftermath of the second Jirau riot were not so convinced of the high quality of working conditions (*e.g.*, Romero, 2012).

An intriguing example of an anomalous score is the assessment of safety in the construction project. The text of the report gives the highest possible approval rating for this criterion, stating that both basic and proven good practice criteria "are fully met with no significant gaps" (p. 41). Yet in the collection of photographs at the end of the report (pp. 177-178), the captions draw attention to "many safety hazards" (Figs. 1 and 2).

Fig. 1

Photo 48: Right Bank Power House with many safety hazards.

Fig. 2

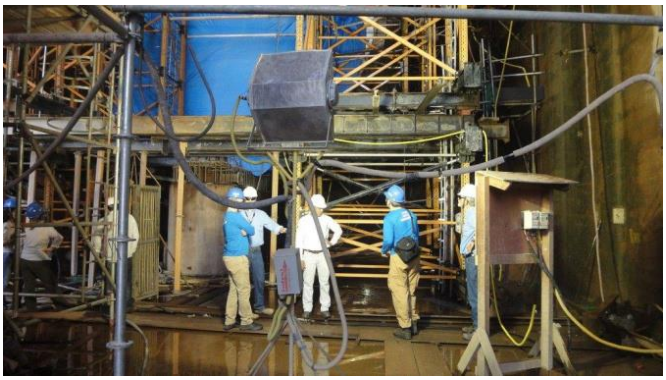

Photo 49: Inside Right Bank Power House - safety hazards.

TRANSPARENCY AND CONSULTATION

The report asserts that the Jirau project has a "high degree of public disclosure, which enables any interested party to have input on matters of interest to them" (p. 13). This contrasts sharply with the experience of many sectors of society, including the scientific community. The Jirau consortium has gone to rather extraordinary lengths to block access to the project to Brazil's scientific community (other than hired consultants or select research groups financed

by the dam consortium). Even Brazil's Minister of Science, Technology and Innovation has been unable to break down this barrier. As a researcher who has studied over a dozen large development projects in Brazilian Amazonia, I can testify that Jirau is the most secretive and least transparent of any I have encountered. One telling fact is that the Secretariat of the Environment of the Municipality of Porto Velho (where the dam is located) has not been granted access to the site despite multiple requests.

The report gives a score of 4 for "consultation and communications." It states that "Consultation meetings with directly-affected stakeholders has been undertaken" (p. 14). One might note that only the fact that meetings were held is mentioned, not the content of the statements made at the meetings. The term "consultation" is not defined, but it is apparent that the report is using the term as synonymous with a "hearing" ("*audiência pública*"), where speakers can make statements but have no actual say in the decision. This contrasts, for example, with International Labor Organization (ILO) Convention 169 (ILO, 1989). The key feature of a consultation is that "those concerned have an opportunity to influence the decision taken" (ILO, 2005). The decision of importance is that of building the dam, not merely the details of how resettlement will be handled.

RESETTLEMENT AND LIVELIHOODS

Resettlement is an issue at Jirau as at most dams. The report praises the Jirau consortium's handling of this: "In general, resettlement has been carried out to a high standard" (p. 73). However, the report also points out that "There is some anecdotal evidence that livelihoods and living standards have declined for some households" (p. 72), and that "The risk of a decline in living standards and livelihoods by some sub-groups, combined with the absence of ongoing surveys for these groups, is a significant gap against basic good practice resulting in a score of 2" (p. 73). The score of 2 (on a scale of 1 to 5) is the lowest given to any of the 20 criteria considered in the report.

I would suggest that the problem of livelihoods is worse than the report recognizes. The report describes the functioning of the fish transposition devices as "uncertain" (p. 64), but, in point of fact, it is not really that uncertain: the devices are very unlikely to work. The report mentions possible substitute measures "if" the transposition device fails to work: capturing fish below the Santo Antônio Dam and trucking them to a release point above the Jirau Dam, or, alternatively, building fish hatcheries (p. 102). These measures, I would suggest, are unlikely to substitute for thousands of the "giant catfish" (for which the Madeira River is famous) migrating to natural spawning grounds in Bolivia and Peru.

The replacement occupations for displaced people, such as fishermen, appear unlikely to substitute for the livelihoods that have been taken away. The report emphasizes "potential regional and local long-term opportunities for local development activities including ....development of a tourist hub linked to nature resources" (p. 48). This is not likely to support many former fishermen due their limited educational level and because Rondônia is famous as a scene of environmental devastation, not as a destination for nature tourism.

An interesting number appearing in the report is that "1,972 fishermen and fisherwoman … participate in the monitoring of fish catch" (p. 62). The Report on Environmental Impact (RIMA) had claimed that the population directly affected by the Jirau Dam totals only 1087, including of all types of urban and riverside residents (not only fisherfolk) (FURNAS *et al*.,

2005, p. 47). The official estimates of the affected population have often been criticized as low by civil society groups (*e.g*., Ortiz *et al*., 2007, p. 6).

A perfect score of 5 was not awarded because "uncertainties of the effectiveness of the measures put in place to improve livelihoods and living standards of manual miners and fishing communities in the long-term, including transboundary communities of fishermen/fisherwomen, resulting in a score of 4" (p. 65). This near-perfect score for "livelihoods" was awarded despite the statement that "The risk of a decline in living standards and incomes amongst these groups is a significant gap against basic good practice" (p. 73). However, the report also says the "uncertainty" regarding the fish passage maintaining livelihoods for fisherfolk is "not significant against basic good practice" (p. 103).

In the case of indigenous territories located further upstream (which also depend on fish as a food source), the report states that "The Ministério Público (the Brazilian body of independent public prosecutors) … holds the view that the territories … should be included. … but it will not delay the issuing of the Operational Licence, as the communities are not directly affected by the project" (p. 75). Needless to say, the populations dependent on fish in Bolivia and Peru are also not included in the companies programs or compensated in any way for their loss of livelihood.

MERCURY

The report casually dismisses some of the major concerns about the impact of Jirau. It claims that "Mercury has not proven to be a major issue at Jirau" (p. 113). The report states that "Some expected health issues, such as bio-accumulation of mercury, have been shown to be less of a problem than originally thought, and the respective education and monitoring programs are expected to be effective" (p. 98), and that "The hydro-biogeochemical program has surveyed the potential public-health issue of mercury being made bioavailable, and monitoring is in place to avoid any negative developments during implementation and operation" (p. 120).

The report mentions that "upstream of Jirau has been a gold-mining area for a long time with total inputs of mercury estimated as high as 30 tonnes" (p. 111), but says that "Reservoir stratification is not predicted to occur, nor the creation of public-health risks" (p. 122). Stratification results in the water at the bottom becoming devoid of oxygen. This creates the environment in the sediments for two dangerous and chemically similar processes. The first is methanogenesis, or the formation of methane (CH_4), which is a greenhouse gas that is much more powerful per ton than carbon dioxide (CO_2). The second process is mercury methylation, or adding a methyl (CH_3) group to an atom of metallic mercury (Hg), forming the highly poisonous methylmercury ($HgCH_3$). Concern over methylation has always focused on the tributaries entering the reservoir (*e.g*., Forsberg & Kemenes, 2006), not the main river channel to which the consultant report is apparently referring. It should be pointed out that modeling of water quality in the tributaries that was done by the project proponents at the request of IBAMA did show stratification in tributaries entering the Jirau reservoir (FURNAS & CNO, 2007, Annex V). There is now some evidence of stratification in tributaries entering the very similar Santo Antônio Reservoir (which was filled over a year before the Jirau Reservoir), located immediately downstream of the Jirau Dam. Methane emissions measured from the surface of water in the tributaries (Hällqvist, 2012, p. 25) indicate stratification. A measurement of high methane concentration in the water just downstream of the Santo

Antônio Dam (Grandin, 2012, p. 28) suggests stratification in the place where the methane was formed somewhere in the Santo Antônio Reservoir.

SEDIMENTS AND FLOODING IN BOLIVIA

The report dismisses the question of flooding in Bolivia caused by formation of a backwater stretch above the reservoir proper as a result of coarse sediment accumulating at the head of the reservoir. The report claims that "modelling … indicates that utilising the variable reservoir-levels identified by ANA [National Water Agency] will guarantee that there is no sedimentation at the extreme upstream end of the reservoir" (p. 108). It is unclear whether the "modeling" being alluded to is from new (and still secret) studies, or whether these are the results that have already been divulged. If the latter is the case, then the report's interpretation has been contested by various researchers in the field (see review in Fearnside, 2013a).

The report claims that "Transboundary issues have been addressed by the ANA resolution, indirectly in the reports to IBAMA as the PBA programs are designed to ensure there are no issues for Bolivia, and in the response to PDD criticisms" (p. 21). As the author of one of the "PDD criticisms" regarding the "issues for Bolivia" alluded to here (Fearnside, 2013a; see also International Rivers, 2012; Molina Carpio, 2012), I find this assertion fascinating. The project proponents distributed a 75-page "response to the PDD criticisms" (ESBR, 2012), to which this passage in the current consultant report is alluding. These are among the many documents on the Madeira River dams that are available in the "Amazon Dossier" section of my website (http://philip.inpa.gov.br). I would challenge anyone to read the two sides of the debate side-by-side and come up with the conclusion reached by the authors of the present consultant report. I would also suggest reading the review of the Madeira River sediments controversy, including the effect of political interference, in my recent paper in the journal *Water Alternatives* (Fearnside, 2013a).

PASSING THE BLAME

The report observes that "not all Installation Licence requirements have been met, with the gaps linked to delays on the part of other government agencies" (p. 21). These "other government agencies," such as the Ministry of the Environment, would probably have a different viewpoint on this. In any case, passing the blame does not alter the fact that the licensing requirements have not been fully met.

ELIGIBILITY AND CDM CREDIT

Additionality

The report points out that "The PDD for the Jirau project estimates the annual GHG mitigation potential of Jirau as approximately 6 million tonnes of CO_2 per year Jirau is part of the Brazilian NAMA (Nationally Appropriate Mitigation Actions) for the electricity sector (p. 26). The PDD does, indeed, make this claim. It has also been roundly contested (Fearnside, 2012; International Rivers, 2012). I would also recommend my paper in the journal *Mitigation and Adaptation Strategies for Global Change* (Fearnside, 2013b) regarding the CDM project for Brazil's Teles Pires Dam, which has many similarities to Jirau as a non-additional hydroelectric project.

An additional indication of the project's almost certain ability to make a profit without the help of the CDM is given by the report's granting the top rating of 5 to the criterion of "Financial viability." The report is confident that: "The projected return on the equity invested by the project owners, who are bearing the main risk of cost overruns and revenue shortfalls, is likely to be in the expected range" (p. 46).

E minus policies

The report states that "The Jirau HPP [hydropower project] is result of a comprehensive governmental policy and develop the Jirau hydropower potential on the basis of a private-public partnership …. and based on project specific and supportive financing conditions. These measures are part of the Brazilian National Climate Change Policy as referenced by law No 12.187/09" (p. 42). The implication of the project receiving "supportive financing conditions," meaning subsidized financing from Brazil's National Bank for Economic and Social Development (BNDES), because dams are included in Brazil's National Plan for Climate Change (Brazil, CIMC, 2008) is an endorsement of the PDD's claim that the subsidized credit is the result of an "E minus policy" ("E – policy"), meaning that it is primarily motivated by intent to reduce emissions. Classification as an "E minus policy" allows the effect of the subsidy to be removed from the calculation of the project's expected internal rate of return (IRR), making the project appear to be less profitable and therefore more likely to be "additional" under the Kyoto Protocol. The report cites a law from 2009 regarding the National Plan for Climate Change, but Brazil has been heavily subsidizing dams for many years before 2009 through a continually evolving series of measures. The practice also extends to long before the adoption of the Marrakesh Accords on 11 November 2001, which is the cutoff date for subsidies qualifying as "E minus policies" (CDM Executive Board, 2005). Classification as an "E minus policy" is supposed to mean that the policy, in this case BNDES subsidized financing for dams, is "primarily motivated" by reducing emissions (CDM Executive Board, 2004, Paragraph 1). The notion that the Brazilian government's support for its massive dam-building program in Amazonia, including Jirau, is "primarily motivated" by concern for greenhouse gas emissions stretches the limits of this author's credulity, but apparently not that of the consultants who drafted the PDD and the current Official Assessment Report.

CONCLUSION

In summary, the "Official Assessment Report" completely omits the principal concern for approval of carbon credit from the CDM, namely whether the dam is "additional," meaning whether would not be built without the subsidy from the carbon project. The fact that construction was well underway before the carbon project was even submitted for consideration on 24 April 2012, and the that the beginning of power generation, which has been delayed several times by technical problems, is now expected to begin in July 2013 (just two months after the Executive Board of the CDM approved the carbon project), clearly indicate that the dam would have been built anyway and is not additional. The financial calculations in the PDD arguing that the dam is additional under CDM regulations indicate instead that the CDM's current regulations are harming the climate and should be changed (see Fearnside, 2012, 2013b). The Kyoto Protocol makes clear that CDM projects should only receive credit if they represent "reductions in emissions that are additional to any that would occur in the absence of the certified project activity" (UN-FCCC, 1997, Article 12, Paragraph 5).

The Official Report in large part reflects the views of the client that commissioned it and provided almost all of the information it contains, namely the consortium building the Jirau Dam. Out of 20 criteria evaluated, the report gives very high marks on all counts but two (biodiversity and resettlement).

The Executive Board approved the carbon project on the same day that it received the report, suggesting that the Board may not have carefully considered the many issues surrounding the Jirau Dam and its carbon project. The Executive Board should reconsider its decision to approve the project.

The Jirau example serves to show the need for reforms that go far beyond reverting the decision on this particular dam. The example lends concrete support to the conclusion that hydroelectric projects should be entirely excluded from the CDM and from any equivalent mechanism to be implanted under post-Kyoto agreements. It also shows how the CDM's evaluation system is inherently biased towards approval of mitigation projects of all types (not only dams), and indicates the need to reform procedures so that projects better reflect the overall intent of the Climate Convention.

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