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## The electrical system, the environmental issue and the climate agenda in Brazil\*

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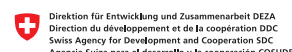
One of the trademarks of the model that regulated the expansion of the energy supply in the 70s – under the military regime – was the disregard to social-environmental impacts generated by the construction of hydro electrical plants, as illustrated by the remarkable examples of Itaipu, Balbina, Sobradinho and Tucuruí. The Itaipu dam flooded 1500 square kilometers of forest and agricultural areas, evicted about 40 thousand people, annihilated an incalculable amount of wild animals and destroyed the Sete Quedas waterfalls, one of the greatest of mankind's natural heritages. Those consequences had already been predicted in 1970, when the feasibility studies of the project were started, a project that was concluded in 1984. However, the dictatorial regime in place at the time prevented public debate over the issue.

\* This text gathers sections dedicated to the interface between the Brazilian electrical system and environmental and climate agendas, presented in the publication Breves Cindes 49, A economia política do setor elétrico brasileiro, available at [www.cindesbrasil.org](http://www.cindesbrasil.org)

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After the end of the military regime, a series of institutional and political changes that took place in the second half of the 80s redefined the terms of the environmental issue in the country. The 1988 Constitution included the defense of the environment among the fundamental principles of national economic order (art. 170) and granted powers to the Federal Prosecutor's Office to ensure the effectiveness of the environmental preservation instruments (art. 129). The following year, Law number 7735, of 22.02.89, created the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA). In several states, laws were revisited, aiming at creating or strengthening state (sub-national) environmental agencies.

Under the influence of this new institutional context, Eletrobras (the electrical sector state *holding*) prepared, in 1990, the Electrical System Environmental Plan (PDMA), which was the first document produced in the country where the goals for the expansion of the energy supply were subordinated to a strategy of environmental preservation. The strategy comprised a set of basic principles and guidelines that should be obeyed in each of the phases of the process of planning, building and operation of electrical plants. According to these criteria, investments in energy could only be made if the basic requirements were followed:

- (a) The initial planning process highlighted the variables indicative of the different social and environmental impacts arising from the enterprises predicted in government goals;
- (b) The actions of preventable nature would be negotiated with the affected social segments, and executed; and
- (c) The costs of those actions should be included in the analysis of the return taxes of alternative energy generation projects;

Regardless of the countless innovative aspects of the PDMA, its formulation was based on the supposition that the actual regulation model would be maintained, where energy planning and investment decisions were

coordinated by Eletrobras. However, those attributions were abolished through reforms introduced during the 90s, where priorities were concentrated on privatization of the sector and change in the sources of financing for investments.

Thus, the PDMA was never implemented, though its conceptual contributions are still relevant nowadays. Especially if one considers that the expansion of the hydro electrical new projects to the Amazon increases the risks (environmental, social and hydric) of the system and the safety of the electrical supply becomes strongly dependent on Petrobras, which remains with the *de facto* monopoly of the supply of fuel for thermo electrical plants. Elevated risks limit the expansion, increase the costs of the system and generate pressures for tariff increases which find resistance in government and society. The mitigation of the risks of the system is crucial for the adequate hydro thermal composition of the electrical generation park.

When the energy crisis was over in 2001, the production complex articulated around the construction of large reservoirs was mobilized to reactivate hydro electrical expansion. Nevertheless, the environmental issue still hampers hydro electrical expansion, as evidenced by the difficulties faced by the government when licensing Belo Monte. More recently, the debate over the forest code does not suggest that the problems of environmental licenses of hydro electrical plants in the Amazon will be easily overcome without profound changes in the approach adopted by the electrical sector in the management of its social and environmental impacts. The current approach is essentially based on the reduction of the dimensions of reservoirs and on the offer of financial compensations for social groups affected by the construction of the plants.

That approach is unsatisfactory, as it does not foresee the multiple uses of water (especially its impacts on local communities) and does not address the worry about global impacts of the economic occupation of the Amazon which, in good measure, is related to the issue of climate change.

The Brazilian electrical system in general and the electrical system in particular, among those with the least emission of GHGs gases, thanks to the strong presence of renewable sources of energy in the energy matrix. The ten-year plan for energy expansion, recently opened for public consultation, suggests that this situation shall remain unchanged in the horizon until 2020.

The plan programmed a supply expansion to support an economic growth of 5% per year during the current decade. That economic dynamic would be supported by an increase in the use of electrical energy *per capita* from the current 2.480 Kwh/year to 3.561Kwh/year. The use of all forms of energy is programmed to follow a pace similar to the electricity, going from the current 1,23 tep/year to 1,87 tep/year. However, energy use per unit of economic product would be stagnant in 71 Kgep/R\$[2008].

In order to serve the predicted demand for electricity, the system generation capacity will have to increase by 61,5 GW. The largest part of that expansion is programmed to come from large hydro electrical plants (32,2 GW), built especially in the Amazon (85%), though a relevant part shall come from alternative sources of energy (10,3 GW from eolic sources; 4,7 GW from biomass and 2,7 GW from small hydro electrical plants). Hence, the electrical expansion's impact will have a small impact on the increase of GHGs gases emissions.

The essential part in the increment of gas emission from the energy system shall come from the transportation sector. However, the plan indicates that the level of gas emission that cause greenhouse effect per unit of economic product (PIB) will be reduced from the level reached in 2005 (127 KgCO<sub>2</sub>eq/1000R\$[2008]) to 120, 5 KgCO<sub>2</sub>eq/1000R\$[2008], in 2020. That result is due to the strong expansion of biofuels (ethanol and biodiesel) in the transportation sector and, to a lesser degree, to gains in energetic efficiency, basically in industrial segments. It is important to notice that the largest share of gases emissions in the Brazilian case originates from deforestation.

In order to estimate the social-environmental impacts of its expansion plan, EPE - a governmental agency for energy research and planning - structured a set of indicators that estimate the environmental effects and social compensations of hydro electrical projects. The EPE study presents the estimates of the impacts for 24 of the 48 hydro electrical projects programmed to be operational the current decade. The larger part of the capacity expansion of these 24 projects is located in Tapajós and Tocantins (in the Amazonian region). However, the EPE study emphasizes that these results shall not be understood as though saying that it is not necessary to obtain careful and thorough environmental impact reports (EIA) to get environmental license for each of these projects.

The greatest difficulties in environmental licensing in hydro electrical projects in Brazil occur at the time of obtaining the previous license. According to a study by the World Bank - *Licenciamento Ambiental de Projetos Hidrelétricos no Brasil: Uma Contribuição para o Debate*, Brasília, ([www.worldbank.org](http://www.worldbank.org)) - "these problems include lack of adequate planning by the government, lack of clarity about which government sphere (federal or state) has legal authority to issue environmental licenses, delays in the issue of terms of reference for the environmental impact study (EIA) demanded by legislation, bad quality of EIAs prepared by the proponents of the project, inconsistent evaluation of EIAs, lack of an adequate system for conflict resolution, lack of clear rules for social compensation and lack of professionals in the social area of the federal environmental organ." The solution for these problems is urgent to avoid a situation where the difficulty in obtaining environmental licenses for hydro electrical plants would result in strong expansion of thermo electrical generation as occurred in the recent past. That risk becomes more present as data from EPE's ten-year plan suggests a strong expansion of the Brazilian production of oil and natural gas.