



The Energy Crisis and the South American Pharaohs: Brazil's Large Dams and the Social and Environmental Costs of Renewable Energy, 1973-1989

Dissertation Proposal
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ABSTRACT:

Brazil is the ideal model for studying the environmental controversies surrounding hydropower. A swell of large dams built by the military dictatorship sent Brazil into the top echelons of global hydropower producers. But these concrete leviathans also created a wealth of social and environmental problems that engendered the rise of an environmental lobby opposing further dam construction. My dissertation will look at the environmental controversies surrounding the four largest dams that Brazil's military government built: Itaipu, Tucuruí, Sobradinho, and Balbina. My preliminary research suggests that pessimism among Brazilians towards hydropower resulted not from the inherent environmental costs but from the manner in which the dictatorship erected them. The exigencies of the 1973 energy crisis and the desire for immediate economic growth pushed the military dictatorship to plan grand hydroelectric projects that were at best expensive and at worse economically pointless, and to skimp on mitigating the social and environmental costs.

Keywords: Hydropower; Dam-building; Brazil

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Are hydroelectric dams, where feasible, a sustainable alternative to fossil fuels for meeting our century's insatiable demand for energy without compromising the health of communities and the environment? The question is far from settled. On the one hand, water is a renewable resource, and reservoirs that are not plagued by sedimentation, water acidification, engineering problems, or water shortages have the potential to provide continuous energy. Furthermore, hydroelectric dams generally release fewer greenhouse gases than do power plants that burn fossil fuels. On the other hand, the twentieth-century is replete with stories of economically senseless dams that have generated significant debt, displaced large groups of poorly compensated people, and degraded the surrounding environment.

Brazil is the ideal model for studying the environmental controversies surrounding hydropower. A swell of large dams built by the military dictatorship in the 1970s and 1980s sent Brazil into the top echelons of global hydropower producers. In 1990, after the dust had settled on the most ambitious of these projects, hydropower made up 96 percent of Brazil's electricity supply.² Today, Brazil is number one in terms of hydroelectric production as a percentage of total electricity consumption. Brazil is second only to China as the world's largest hydroelectricity producer in terms of gross production.³

Nevertheless, Brazil's concrete leviathans also created a wealth of social and environmental problems that engendered the rise of an environmental lobby opposing further dam construction in Brazil. The environmental lobby has not completely derailed dam-building, but it stalled planning and construction in the decades since the dictatorship fell in 1984.

In some cases, planned dams were completely shelved. For example, during the 1980s, the Brazilian government planned to build the Cachoeira Porteira Dam on the Trombetas River in Amazônia to meet increasing energy demand of the region. The dam was never built, and today 84 percent of the state of Amazonas' electricity needs are met by fossil fuels.⁴ In 1986, the Brazilian government passed legislation that required environmental impact studies to be conducted prior to construction. Cachoeira Porteira, it turned out, had grave consequences. Like other Amazonian dams, the reservoir would have flooded a large area of rainforest and displaced indigenous communities and

² Eletrobras, Relatório Anual 1990, 3, Library of Congress (LOC), Washington D.C.

³ Kevin Lillis, "Hydropower Supplies More than Three-Quarters of Brazil's Electric Power," *U.S. Energy Information Administration (EIA)*, 2014. Accessed online.

⁴ Renan Albuquerque Rodrigues, "Vidas Despedaçadas: Impactos Socioambientais da Construção da Usina Hidrelétrica de Balbina (AM), Amazônia Central," Ph.D. Diss., Universidade Federal do Amazonas, 2013, 74.

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disrupted their subsistence practices. In addition, The reservoir would have flooded large quilombo communities, as well as some of the largest turtle breeding grounds in *Amazônia*.⁵ The environmental impact was so great that the *Ministério do Meio Ambiente* did not approve the project. An economic downturn provided further disincentive. In the following years the money and motive to build *Cachoeira Porteira* returned, but the dam's large environmental footprint continued to impede construction.

In other cases, dams were erected with significant modifications. *Belo Monte*, a controversial Amazonian dam still under construction, was scaled down to avoid flooding indigenous people's land. It was built as a run of the river dam, which means that no large reservoir formed behind the dam. Such dams are more closely tied to seasonal variations in rainfall for power production and as a result produce much less power. Nevertheless, such dams also significantly reduce the project's environmental impact.⁶ *Belo Monte* is not without its problems. Ecologist Philip Fearnside argues that the small reservoir formed displaced 20,000 and damaged the river's ecosystem.⁷ Nevertheless, environmentalists, though unable to halt construction, pushed through significant modifications that reduced the dam's footprint. In short, although Brazil's large dams have catapulted the country into the highest ranks of hydropower producers, the alarming environmental costs of these dams has fueled an environmental lobby that has done much to halt further dam construction.

My dissertation will look at the four largest dams that Brazil's military government built. *Itaipu* dam, completed in 1984 with the capacity to produce 14,000 megawatts, more than enough to power New York City or Portugal today. It was at the time the largest hydroelectric dam in the world measured by installed capacity (China's *Three Gorges Dam* outstripped it). *Tucuruí* dam, finished the same year with the capacity to produce 8,000 megawatts of energy, was second. In addition to generating capacity, the size of the reservoirs was also unprecedented. *Sobradinho* dam, erected in the arid northeast in 1982, flooded 4,250 sq km of land, an area larger than Rhode Island and created the western hemisphere's largest reservoir held behind a single dam. Likewise, *Tucuruí* and *Balbina* dams, both built in *Amazônia* in the 1980s with reservoir sizes of roughly 2,500 sq km, created the fourth and

⁵Eletronorte, *Aproveitamento Hidrelétrico de Cahoeira Porteira Relatório de Impacto Ambiental (RIMA)*, January, 1988. Arquivo de Eletronorte, Brasília.

⁶Grant Burrier, "The Development State, Civil Society, and Hydroelectric Politics in Brazil," *Journal of Environment and Development* 25, no.3 (2016): 332-358.

⁷Philip Fearnside, "How a Dam Building Boom is Transforming the Brazilian Amazon," *Yale Environment* 360, September 26, 2017.

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fifth largest reservoirs in the western hemisphere retained by a single dam.⁸ The geographical diversity of these case studies reflects the intention of the military government to build dams in locations that would integrate the country and shore up support for their regime.

Studying Brazil's large dams from a national perspective builds on and ties together a story that has hitherto been confined to case studies, written mostly by environmental scientists, anthropologists, and political scientists, that weights the costs and benefits of large dams.⁹ Looking at Brazil's dams from a historical perspective can build on this scholarship and address the political and economic motivations for building the dams, the negotiations about where and how to build them, what environmental costs were weighed in these discussions, and how those displaced adapted and were compensated by the government. Two historians, Warren Dean and Shawn Miller, have broached the topic, but neither discussed Brazil's large dams at length.¹⁰ Since large dams are essential to the country's energy regime and they have had such huge social and environmental consequences, Brazil's reservoirs deserve more scholarly attention from historians.

Historical research on Brazil's large dams is urgent on two fronts. First, the current Brazilian political and economic crisis means that archives now open may not be in the coming years due to budget cuts. This threat is especially severe at the Eletrobras archives because the government is considering privatizing the entire electricity sector. Second, Brazil is continuing to build large, environmentally controversial dams. Finally, the first stages of a global energy regime transition appear to be underway. Industrial countries are using renewable energy on a growing scale, and choices loom

⁸ Venezuela's Guri Reservoir is almost exactly the same size as Sobradinho, and by some measurements slightly larger. Canada's Smallwood and Caniapiscau Reservoirs are the two largest reservoirs in the western hemisphere but they are held behind many dams and dikes.

⁹ Rolf Sternberg, "Large Scale Hydroelectric Projects and Brazilian Politics," *Revista Geográfica* 101, (1985) 29-44; Luiz Pinguelli Rosa, Lygia Sigaud e Otávio Mielnik, *Impactos de grandes projetos hidrelétricos e nucleares: aspectos econômicos e tecnológicos, sociais e ambientais*, (São Paulo: Editoria Conselho Nacional de Desenvolvimento Científico e Tecnológico, 1988); Luiz Pinguelli Rosa, Lygia Sigaud, and E Lèbre La Rovere, *Estado, Energia Elétrica, e Meio Ambiente: O Caso das Grandes Barragens*, (New York: Ford Foundation, 1995). Renan Albuquerque Rodrigues and José Aldemir de Oliveira, "Impactos sociais da desterritorialização na Amazônia brasileira: o caso da hidrelétrica de Balbina," *Emancipação* 12, no.1 (2012): 35-53; James Randall Kahn, Carlos Edwar Freitas and Miguel Petrere., "False Shades of Green: The Case of Brazilian Amazonian Hydropower," *Energies* 7, (2014): 6064-6081; Costa, Ana Luiza B. Martins, A. Oswaldo Seva, Aurélio Vianna, Carlos Walter Gongalves, João Jeronimo Monticelli, *Hidrelétricas, ecologia, e progresso: contribuições para um debate*, (Rio de Janeiro: Centro Ecumênico de Documentação e Informação, 1990).

¹⁰ Warren Dean, *With Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest*, (Berkeley: University of California Press, 1997); Shawn William Miller, *An Environmental History of Latin America* (New York: Cambridge University Press, 2007).

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that include further investment in hydropower. As the world beyond Brazil considers transitioning to renewable energy, looking towards history for examples of both mistakes and accomplishments will better inform politicians and voters about how best to mitigate the costs of hydropower or whether to select different energy sources.

Methods

This proposal is ambitious but feasible. Brazilian archives do not have a wealth of readily available information about the military dictatorship's environmental footprint, but the largest and most controversial hydroelectric dams did leave behind a significant paper trail. Government agencies and state companies, such as Eletronorte, which built Balbina, have their own libraries that are open to consultation. On a scouting visit to Brasília I visited the Eletronorte archive and was granted access to historical documents about Balbina and Tucuruí dams. I also visited a handful of government agencies, such as the Ministério de Minas e Energia (MME), to confirm that they have germane information available to researchers. I plan to visit the archives of Itaipu Binacional and Companhia Hidrelétrica do Rio São Francisco (CHESF), as well as the central archive of Eletrobras, which is in Rio de Janeiro. The libraries and archives of government agencies and companies in Brasília and Rio de Janeiro will therefore make up a principal component of my research. By reading unpublished government reports, internal correspondence, notes from engineers, and other documents from these archives, I can ascertain the political and economic pressures motivating those engineers and politicians who advocated these dams and how they weighed social and environmental costs.

A second component of my research will be regional archives in the cities closest to these dams and the capitals of the states in which they were built. Despite the censorship of the dictatorship, these dams consistently made headlines in local press, even more so after the *abertura* in 1974. The Public Archives of the State of Curitiba house collections of local newspapers containing lengthy debates about Itaipu dam and its social and environmental costs that are not available elsewhere. For example, articles recount local residents' lamentations about the disappearance of the *Sete Quedas* under the dam and protests for more just compensation for those displaced. Similarly, newspapers available in the Public Archives of the State of Amazonas document the vigorous debates surrounding Balbina. In addition to newspapers and other collections that I will consult at state public archives, government agencies and universities in each state will have pertinent information. For example, in the 1980s the Federal University of Amazonas hosted debates between engineers and environmental scientists about

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Amazonian dams. These discussions were recorded and are available at the university's library in Manaus. Likewise, the Instituto Nacional das Pesquisas de Amazônia (INPA), the leading research institution for the environmental footprint of Tucuruí and Balbina dams, has a library that is open to researchers. I met with Philip Fearnside, a leading researcher there, who has confirmed that in addition to published material the institute has non-published sources available to researchers.

Third, there are a wealth of non-governmental organizations that have archives available to researchers. Egidio Schwade, who organized and led the resistance movement against Balbina, founded the Arquivo da Casa de Cultural do Urubuí, located in Presidente Figueiredo, a few hours' bus ride from Manaus. On a scouting trip I visited the archive, which holds rare documents about indigenous protests against the dam. Similarly, the Comissão Pastoral por Terra (CPT), an ecclesiastical group that advocated for fair compensation for those displaced by Itaipu and Sobradinho, has an archive available to researchers. Many of their documents are available online, but more germane information might also be found in regional headquarters, such as Santa Helena, a town near the Itaipu reservoir. The Movimento dos Atingidos por Barragens (MAB) was similarly involved in supporting those displaced. Their headquarters in São Paulo and the headquarters of regional branches have libraries with relevant documents. Lastly, the Centro de Memória Eletricidade in Rio de Janeiro has a wealth of pertinent information about the history of hydroelectric dam construction in Brazil.

With sufficient funding I could to spend twelve months divided among the sites relevant for my project. Since I have already established connections and relationships with archivists and researchers in many of these places, both in person and through email, twelve months will be sufficient time to study and photograph most of the relevant documents. I will be applying for additional external funding to conduct oral histories and if necessary to revisit any collections that need additional consultation after I have concluded this first year of research.

Results

My preliminary research suggests that pessimism among Brazilians towards hydropower resulted not from the inherent environmental costs but from the manner in which the dictatorship erected them in the 1970s and 1980s. The military government built dams with huge reservoirs and allocated few resources to social and environmental concerns. The 1973 energy crisis pushed the generals to rapidly develop domestic energy sources at all costs and they believed that dams built in frontier and socioeconomically underdeveloped areas would stimulate economic growth that would

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legitimize their tenure. The military government prioritized such geopolitical concerns and built Brazil's large dams with almost total disregard to the large numbers of displaced people and attendant environmental problems.

Moreover, initial findings hint that the greatest opposition to large dams arose not from the environmental costs themselves but from the sparse benefits relative to these costs. The most vehement criticism that environmentalists and local residents leveled at the reservoirs concerned their meager benefits, or the unequal distribution of benefits in cases where the reservoirs produced abundant power relative to their costs.

Thus, far from being a response to innate costs and shortcomings associated with hydropower, resistance to large dams in Brazil grew as a reaction to a particular historical context that shaped how reservoirs were built in the preceding decades. The exigencies of the 1973 energy crisis and the desire for immediate economic growth pushed the military dictatorship to plan grand hydroelectric projects that were at best expensive and at worse economically pointless, and to skimp on mitigating the social and environmental costs.

In the 1970s and the 1980s Brazil's military government built a profusion of large dams. Across the entire country engineers erected huge hydroelectric projects, unprecedented in terms of both power generation and reservoir size, on most of Brazil's major rivers. These large reservoirs were the third and most recent pulse of dam construction in the country's history. In the first half of the twentieth century private companies built small generating plants to electrify cities, and in the decades following World War II the government erected larger dams to meet growing and projected demand from urban and industrial centers. What made this third phase unique was the size and the breadth of the campaign. The generals dreamed of integrating the entire country, and their plans for building dams reached beyond the densely populated industrial southeast and into the arid northeast and tropical *Amazônia*, hitherto unintegrated into the national energy grid.

Economic crisis put pressure on the military government to invest in hydropower. The blueprints for many of the government's dams had been drawn in the 1960s, but it was the energy crisis in 1973 that provided the catalyst for the construction boom. When the United States resupplied Israeli troops during the 1973 Arab-Israeli War, the Arab members of OPEC abruptly stopped shipping oil to the United States. The embargo caused oil prices to soar and created an economic crisis for countries that depended on oil imports to meet their energy needs. Brazil was one of these countries and the

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crisis had lasting ramifications. General Ernesto Geisel, President of Brazil in the aftermath of the crisis, exclaimed that “the [oil] shock was, in fact, the start of a new era for all of modern industrial civilization.” He believed that as a result of the shock, “a process was initiated that...must extend until new sources of energy come to assume the role that petroleum still predominantly plays today.”¹¹ For Geisel the crisis highlighted the perils of imported petroleum dependence and the needs to develop alternative sources of energy.

Dams were favored by the military government because Brazil's river basins had huge potential and because hydroelectricity is renewable.¹² Of course, a lot of attention was also given to domestic oil, because alternative sources for electricity alone could not completely cut the country's dependence on petroleum. But the crisis atmosphere engendered a deep and lasting commitment to hydropower. On a visit to Amazônia on November 4, 1978 President Geisel explained that Balbina Dam was planned so that “in the future we do not have to remain dependent on imported oil supplies because of scarce domestic energy production.”¹³ Though hydropower could never completely erase petroleum dependence, the military government embarked on an ambitious dam building program to reduce their oil imports.

In an address to the Ministry of the Interior on November 5, 1984, Brazilian President José Sarney summarized the military government's hydro-engineering efforts:

They were grand works. Grand because of the size of our population, because of the dimensions of our needs, and, principally, because of the grandeur of our country. How could we take advantage of the potential of giant rivers like the Paraná or the Tocantins without dams that are also gigantic? Taking advantage of them is our duty. Using them for the benefit of our people is our obligation.¹⁴

Thus, this third pulse of dam construction was unique from its predecessors because of the size and grandeur of the dams the military government built. But President Sarney's remarks also highlight the nonmaterial concerns that motivated the generals. In addition to the material benefits of energy production, large dams also had symbolic importance. Dams showcased the

¹¹ *Balanço Energético Nacional, 1978*, Biblioteca Roberto Simonsen FIESP-CIESP, São Paulo. Author's translation.

¹² *Balanço Energético Nacional, 1977*, Biblioteca Roberto Simonsen FIESP-CIESP, São Paulo.

¹³ Ernesto Geisel *Visita a Amazônia*, November 4, 1978, 521, Biblioteca Presidencial. Accessed Online. Author's translation.

¹⁴ José Sarney, *Speech to the Ministry of the Interior* November 5, 1984, 225-226, Biblioteca Presidencial. Accessed online. Author's Translation.

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military government's ability to tame giant rivers and stimulate economic growth, which helped legitimize their rule.

During the inauguration of Bhakra Nangal Dam in 1954 India's prime minister Jawaharlal Nehru famously called the dam a "temple of modern India." If dams hold enough symbolic power to be called temples of the modern world, then the Brazilian military government could be referred to in this context as modern South American Pharaohs because they built some of the largest and most impressive dams the world has seen.¹⁵ Although demand for energy goes a long way in explaining the immediate need for large dams, the political context helps to explain the size and breadth of the generals' ambitions as well as some of the more economically dubious projects such as Balbina.

These concrete behemoths created social and environmental controversies whose intensity matched their size. For example, Balbina Dam is widely regarded as an environmental disaster. Both the governor of Amazonas and the former president of Eletronorte, the state company that built the dam, have lamented its construction and remarked that the reservoir should never have been built in the first place.¹⁶ In the 1990s former Secretary of Science and Technology José Goldemberg famously called Balbina "a monument to human insanity," a statement which former Brazilian President Luiz Inácio 'Lula' da Silva more recently reaffirmed.¹⁷ The dam inundated 2,350 sq. km of mostly flat tropical rainforest. Sluggish water means that Balbina produces less than half of its installed capacity of 250 megawatts of power, which is an incredibly small amount of electricity relative to the financial, social, and environmental costs of the project. When Eletronorte failed to clear the forest in the reservoir area prior to construction, decomposing vegetation made the water in the reservoir acidic, which threatened to corrode the dam's turbines. Likewise, as a result of chemical changes associated with decomposing vegetation and fluctuations in the reservoir's level to produce power, the dam releases large amounts of both methane and carbon dioxide, two greenhouse gases that contribute to climate change.¹⁸ Although

¹⁵ My use of the term here is influenced by Philip Fearnside, who referred to the Balbina dam as a pharaonic work, and Susanna Hecht and Alexander Cockburn, who refer to the military government as Pharaohs when referencing the trans-Amazônian highway and other large construction projects the generals undertook in the Amazon.

¹⁶ M. Lopes, "Hoje Eletronorte não constuiria Balbina," *A Critica*, July 18, 1986; "Presidente da Eletrnorte abre o jogo e se diz frustrado—Balbina é um pecado," *A Critica*, March 19, 1989.

¹⁷ "No Chile, Lula lembra hidrelétrica de Balbina e defende cuidado ambiental," *O Globo*, April 27, 2007.

¹⁸ Philip M. Fearnside, "Brazil's Balbina Dam: Environment and the Legacy of the Pharaohs in Amazonia," *Environmental Management* 13, no.4 (1989): 401-423.

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Balbina is the most heavily criticized of Brazil's large dams, apart from greenhouse gas emissions its environmental footprint was on par with the other large dams built by the military government.

All of Brazil's largest dams displaced local communities. Sobradinho engendered the worst resettlement issues. The 4,200 sq. km reservoir, the largest in South America, displaced roughly 70,000 people. Sobradinho dammed the São Francisco River in the middle of the sertão, the driest region of the country. In such an arid climate, agricultural yields were poor and most people fished and raised livestock for subsistence. Thus, populations clustered around the river, which produced fish and seasonally flooded fertile pasturelands. Four large towns and a handful of smaller settlements were flooded when the Sobradinho reservoir began to fill. In many cases, resettled families were given inadequate land far from the river or small cash payments that were sparse compensation. As the water level rose at Sobradinho, similar situations unfolded at both Itaipu and Tucuruí. Itaipu displaced 45,000 people. The borderlands in western Paraná had only just been settled in the preceding decades, and many land claims had yet to be formalized. Indemnification surveys proved to be such an administrative disaster that the military government initially declared all land titles invalid.¹⁹ Tucuruí displaced 35,000, among whom were indigenous groups whose land and resources were already under threat from the military government's highway construction.

In contrast, the area surrounding Balbina was relatively depopulated. However, the reservoir inundated land belonging to the Waimiri-Atroari, an indigenous Amazonian tribe that suffered greatly at the hands of the military dictatorship.²⁰ Their population had been as high as 3,500 as late as 1973. That year the military government began construction on Brazilian highway 174, which sliced through their land. The generals used violence when the group resisted and in the following decade their numbers declined precipitously. When construction began on Balbina in 1985, only 374 members remained.²¹ The reservoir flooded two of their ten remaining villages, displacing 110 people, roughly 30 percent of the tribe's population. The population has since rebounded thanks in large part to funding provided by Eletronorte in response to criticism directed at the project.²² To be sure, the government sponsored Waimiri-Atroari Program is not without its critics. Egydio Schwade, leader of the indigenous

¹⁹ Gerd Kohlhepp, *Itaipú Basic Geopolitical and Energy Situation: Socio-economic and Ecological Consequences of the Itaipú Dam on the Rio Paraná* (Deutsches Zentrum Fur Entwicklungstechnologien, 1987), 55-72.

²⁰ José Porfírio F. de Carvalho, *Waimiri-Atroari: a história que ainda não foi contada*, (Brasília, 1982).

²¹ Fearnside, "Brazil's Balbina Dam," 1989.

²² Fearnside, "Revisitando Balbina," *Amazonas em Tempo*, May 4, 1994.

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resistance movement against the dam, claims that despite population growth the quality of life has deteriorated among indigenous residents after the construction of Balbina. Despite these undeniable losses, the impact of Balbina dam on the local population not as dramatic as in some of the military government's other large reservoirs.

Seen at a national level then, Balbina appears unique not for its environmental costs but for the meager benefits it produced and the disproportionate level of criticism leveled at the project as a result. Preliminary research suggests that the argument also holds true for other environmental impacts such the impact of the reservoirs on the health of local populations, the flooding of culturally important sites, and the threat of sedimentation and turbine corrosion.

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A crise de energia e os faraós da América do Sul: as grandes barragens do Brasil e os custos socioambientais da energia renovável, 1973-1989

RESUMO

Brasil é o modelo ideal para estudar as polêmicas ambientais em torno da energia hidrelétrica. Um monte de barragens grandes construídas pela ditadura militar enviaram Brasil nos níveis altos de produtores de energia hidrelétrica do mundo. Porém, estas obras de concreto gigantes também trouxeram uma grande quantidade de problemas socioambientais que ocasionaram o surgimento de um lobby ambiental que lutou, com alguns sucessos, contra construção de mais barragens. Minha dissertação vai tratar das controvérsias ambientais das quatro usinas hidrelétricas mais grandes que o governo militar construíram: Itaipu, Tucuruí, Sobradinho, e Balbina. Minha pesquisa preliminar sugere que o pessimismo entre ambientalistas Brasileiras sobre energia hidrelétrica não é um resultado de seus custos inerentes, mas um resultado da maneira em que a governo militar construíram as usinas. A pressão do crise de energia de 1973 e o desejo por crescimento econômico imediatamente impeliram a ditadura militar para planejar grandes projetos hidrelétricos que no melhor foram caro e no pior economicamente sem sentido, e para cercear em mitigar os custos socioambientais.

Palavras Chave: Usinas Hidrelétricas; Construção de Barragens; Brasil.

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Appendix A: List of Relevant Archives I plan to consult

Arquivos das Companhias Hidrelétricas

Biblioteca do Eletronorte (Brasília)
Biblioteca do Itaipu Binacional (Foz de Iguaçu)
Biblioteca do Companhia Hidrelétrica do Rio São Francisco (Recife)
Biblioteca do Eletrobras (Rio de Janeiro)

Arquivos dos ONGs

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