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Environmental Resistance and the Politics of Energy Development in the Brazilian Amazon

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Since the energy shortage in 2001, there has been renewed interest in energy-generation projects in Brazil. Policy options under consideration include expansion of natural gas exploration and hydropower generation in the Amazon. This article analyzes environmental opposition to two projects, the Urucu pipeline and the Belo Monte Dam. Despite significant environmental and social costs, development of energy resources is a critical political issue. Proponents tend to be politically well connected, are willing to face strong opposition, and pursue projects over a long time period. Opposition strategies have had limited effectiveness because of the project's larger context and because there are few incentives for compromise solutions. However, polarization is unlikely to lead to lasting solutions and reduced environmental impact. This may be an important consideration when fighting against other proposed high-profile regional projects with larges-scale environmental implications, such as the Madeira dams and the Transcontinental pipeline.

Keywords: *Brazil; Amazon; energy policy; hydroelectric dams; Belo Monte; Urucu pipeline; environmental mobilization; environmental impact*

In 2001, Brazil experienced an energy shortage that led to rationing for 9 months (June 2001 to March 2002), a reduction of an average of 16.3% in energy use (Government of Brazil, 2002). Since then, there has been a renewed search for additional and diversified energy sources, and new interest in large energy generation projects. A number of the policy options that are under consideration—expansion of the use of natural gas and increase in hydropower—are for the most part new versions of projects that met with strong opposition because of their high environmental and social costs, including environmental costs for the Amazon (Bermann, 2002a, 2002b; Poppe, 2003).

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To bring natural gas from Bolivia to Brazil, a pipeline is being built through an ecologically fragile area in the Pantanal. The Urucu pipeline in Amazonas also goes through ecologically sensitive areas (Gawora, 2003; Passos, 1998). Similarly, some of the dams that are planned, such as Belo Monte and the Madeira Complex, will have a considerable impact on the Xingu and Madeira basins (Fearnside, 2005a, 2005b).

The Brazilian government's proposed strategies and projects for increasing energy supply (Government of Brazil, 2005) will have significant environmental and social impacts and skewed cost–benefit distribution according to analysts (Bermann, 2002b, 2002c; Coalizão Rios Vivos, 2002; Sevá, 2005; Tolmasquim, Seroa da Motta, La Rovere, Lima Barata, & Monteiro, 2001).

Given these costs, which range from environmental impact to high generation costs and social displacement, there has been public opposition to many of the proposed projects (Coalizão Rios Vivos, 2002; Little, 2003). In addition, critics have made credible arguments that it would be possible to supply the country's growing energy demand at comparable prices—and with lower environmental and social impact—by creating incentives for the use of renewable energy sources; by increasing efficiency of transmission systems; by decentralizing generation through the development of small hydro, solar, and wind resources; and by increasing ethanol, biodiesel, and biomass generation, as well as cogeneration, gasification of organic residues, and other alternative strategies (Bermann, 2002a; Fearnside, 2004, 2005a, 2005b; Sevá, 2005).[1]

Drawing from the policy advocacy coalition literature, this article looks at two proposed energy development projects in Brazil, their history, their outlined environmental and social impacts, and the main actors involved, to explain why they have remained as policy choices for energy development in the face of strong opposition. The two energy projects analyzed are the Belo Monte Dam and the Urucu gas pipelines. The main contention is that although the environmental and social costs of these projects are well known, energy development is critical to the economy. As a strategic policy issue, the Brazilian government is willing to confront organized opposition. Unless there is a shift in economic interest (and lack of private investment) in the proposed projects or a marked decrease in demand for energy in Brazil, these projects are unlikely to be taken off the policy agenda. In addition, opposing coalitions, given their limited resources, political agenda, and perception of the issues, have opted for strategies that seek to block these projects and remove them from the government's agenda.

Policy Advocacy Coalitions and Energy Policy in Brazil

The literature on policy advocacy coalitions (e.g., Sabatier & Jenkins-Smith, 1993, 1999; Schlager, 1995) suggests that changes in policy often happen through

dynamic interaction among actors within a policy arena, when these actors coalesce loosely around certain core values or interests forming a "policy advocacy network." Such networks tend to evolve over time as their policy ideas adapt in response to changing social and economic contexts, political events, or policy learning. As such, the structure and balance of power in these networks change over time. This allows the researcher to focus on the dynamic relationships within and between advocacy coalitions, instead of focusing on a single institution or level of government (John, 2003; Sabatier, 1991).

This view of the policy process argues that advocacy coalitions or networks are able to define problems, set the agenda for solutions, and persuade policy makers to achieve desired policy outcomes. Policy coalitions are defined as

> a variety of public and private institutions at all levels of government who share a set of beliefs (policy goals plus causal and other perceptions) and who seek to manipulate rules, budgets and personnel of government institutions in order to achieve these goals over time. (Sabatier & Jenkins-Smith, 1993, p. 5)

The evolution of energy development policy in Brazil fits well with the advocacy coalition approach because it is a case of long-term interactions between competing coalitions that have sought to place large-scale energy development projects on the government agenda, and opposing advocacy coalitions that have manifested their opposition to many of these projects on the grounds of their environmental and social impacts.

Despite environmental and social costs, and an evolving political context, the coalitions pursuing large-scale energy development have continued to dominate the policy process. There are two main explanatory factors: (a) potential gains—because energy development is an economic and strategic issue, government and private actors involved are willing to face opposition given potential gains—and (b) power asymmetry—a characteristic of Brazil's patrimonial politics—affords the dominant coalitions much better access to key decision makers and resources (financial and personnel), which has allowed them to pursue agendas through long time periods (Roett, 1978). In contrast, opposition coalitions are generally composed of political outsiders with weak connections in core government agencies.

A third factor is the opposing coalitions' choice of strategy. Because of limited resources, they tend to politicize issues and capitalize on public pressure, thus adopting strategies that aim at blocking these projects or removing them from the government agenda altogether. Common strategies involve orchestrating media campaigns to catalyze public opposition, or using the legal system to block implementation of the projects. Although the choice of these strategies is often motivated by the autocratic nature of the actors in the dominant coalition and their unwillingness to engage in dialogue with opposing interests, they also have disadvantages.

Among their disadvantages are (a) many campaigns cannot be sustained for very long given the cyclical nature of public attention, unless coalitions are capable of

moving to a consolidation of their actions quickly (Downs, 1972; Keck, 2002; Kingdon, 1984); (b) the use of the court system can be protracted and drain resources, and although it has in some cases delayed projects or led to changes in project design, it does not generally produce lasting results (Keck, 1998; Little, 2003); and (c) focusing on public support in general can lead opposing coalitions to act without regard for the local and the larger political contexts (Fox & Brown, 1998; Keck, 1998, 2002). In such cases, opposition coalitions may fail to make optimal use of their resources and take advantage of opportunity structures for action (Fox & Brown, 1998; Keck, 2002). Thus, although mobilization of public opinion and the use of the court system can be useful strategies in general, in the case of energy development in Brazil, they are likely to yield mixed results.

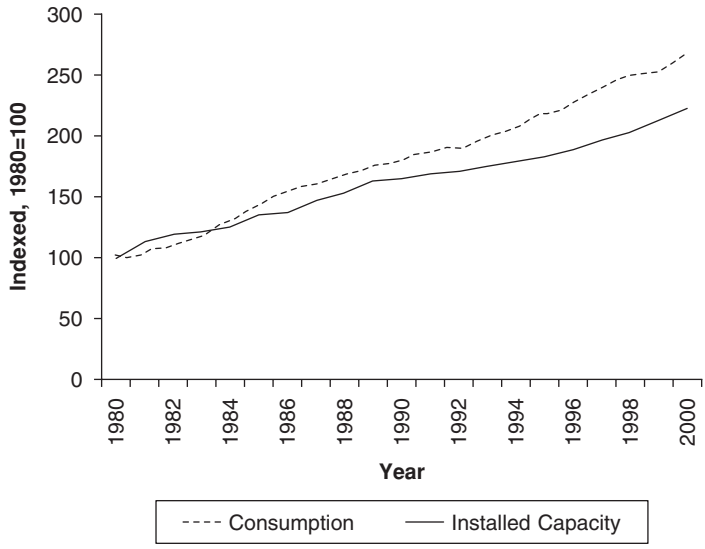
Brazil's Energy Context

In 2001, Brazil was forced to cope with an electricity shortage that had gone unaddressed for several years. Since 1993, the increase of energy generating capacity at 3% per year was surpassed by the increase in consumption that had been growing at 5% per year in the same period. This growing deficit was somewhat masked because 87% of Brazil's electric energy comes from hydropower, a more elastic supply source than thermal energy. Investment in the energy sector had slowed down significantly since the 1980s when the mean annual investment in the sector was US$13 billion. During the 1990s, that figure was $7 billion per year despite continued growing demand. The decline in investment was due to lack of clarity of rules for the sector and impending privatization (Angle & Erckert, 2001). The growth in demand and lagging supply led to a deficit that became obvious to the public during the 2001 drought. Many analysts blamed the energy shortage on lack of planning, lower investments in the energy sector, and a drought that left many reservoirs at 34% of their capacity (Iwami, n.d.; "O Racionamento e a E & E," 2001; Patusco, 2001; Pinguelli, 2001). The fact that the Brazilian energy generation and distribution systems are not fully integrated aggravated the situation because the southern and northern systems had surplus energy but could not be tapped to help equalize the shortage in the southeast and northeast systems.

Many in government and private sectors saw the energy shortage approaching; however, little was done to prevent it. The Brazilian government claimed it was caught by surprise due to lack of communication between government agencies and lack of investment in the energy sector, and thus it had to resort to energy rationing.[2]

The energy shortage was temporarily addressed in 2001 by rationing and rainfall; however, there is still an ongoing risk of deficit and projected shortfall of 20,000 to 44,000 megawatts (MW) by 2010 if the country is to meet the projected economic growth rate of 5% per year according to projections by the energy sector, as depicted

Figure 1
Growth in Electricity Demand and Installed Capacity
1980 to 2000, Indexed 1980 = 100

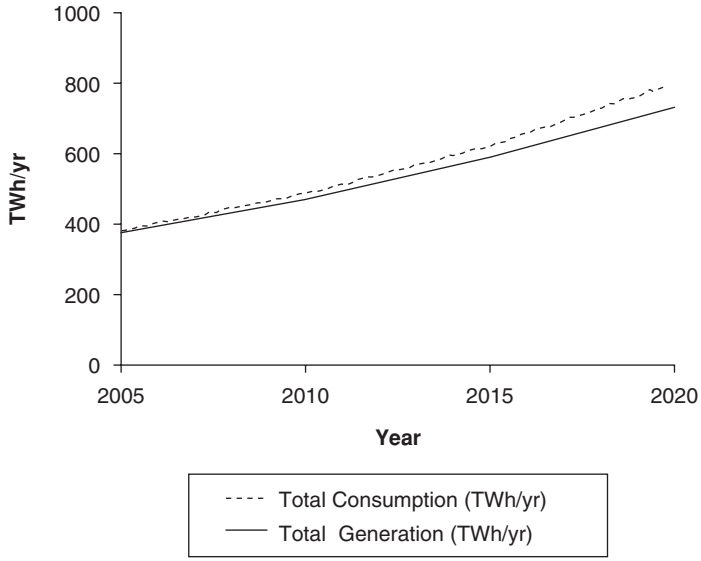


Source: Departamento Intersindical de Estatistica (2001).

in Figures 1 and 2 (Câmara Americana de Comércio, 2002; Government of Brazil, 2005; Sevá, 2005). Although the sector's projection is somewhat inflated, because it is based on a high growth rate, the threat of rationing has not disappeared completely, and in early 2004 and 2005 there were still high risks of rationing in the northeast. This projected energy gap in Brazil cannot be solved overnight; it will require consistent expansion of the power generation sector and control of the growing demand. The projected investments needed for the sector to avoid a deficit are estimated to total $47 billion by 2010 (Câmara Americana de Comércio, 2002; Berman, 2002a, 2002b).

This situation provided a renewed impetus for updating energy policy in Brazil, and specifically for proposing projects that expand energy-generating capacity. It also provided the Brazilian government with a window of opportunity to pursue energy development projects despite their environmental and social costs. The main policy directives that emerged are (a) increasing hydropower generation capacity and (b) expansion of use of natural gas (Government of Brazil, 2005). These have resulted in projects with considerable environmental and social costs, including

Figure 2
Projected Growth in Brazil's Total Annual Electricity Consumption and Generation Capacity for 2005 to 2020



Source: "Geração de Energia Elétrica," 2002; Government of Brazil (2005).

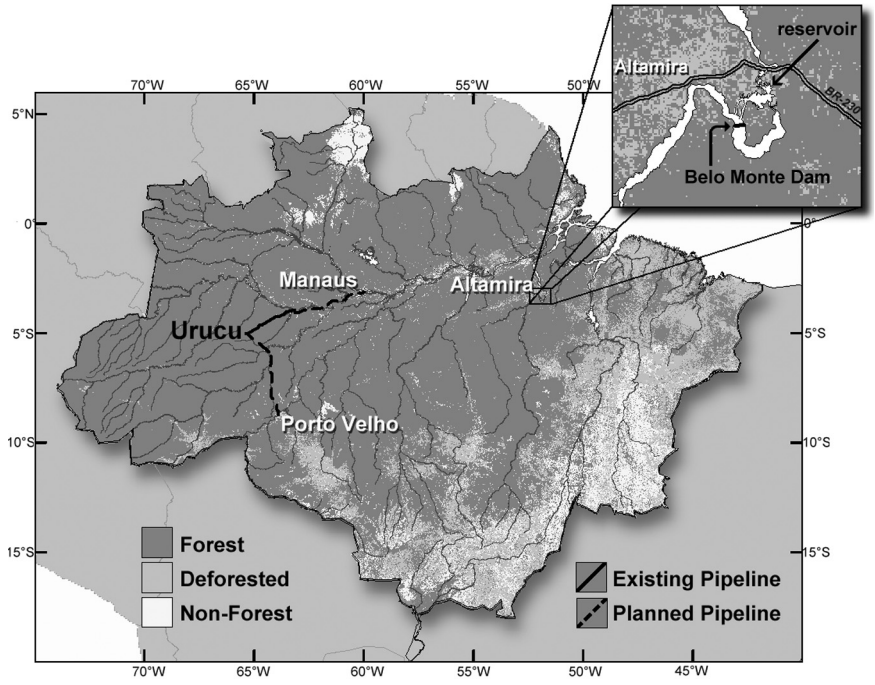
some that affect the Amazon region. Among them were a few hydropower projects (the Xingu Complex, including Belo Monte, and the Madeira Complex) and two main pipelines (Urucu and the Brazil-Bolivia pipeline).

The next sections examine the Urucu pipelines and the Belo Monte Dam as case studies in regard to their background, the main coalitions involved, and the outlined benefits compared to expected environmental and social impacts. These cases were chosen because of the organized opposition to them.

The Urucu Pipelines

Discovered in 1986, the Urucu gas reserves are located in central Amazonia, roughly 600 km west of Manaus (Figure 3). These gas fields total approximately 98 billion m^3 and have been producing oil (from the Urucu reservoir) on a small scale for a decade. Initially, oil and gas were transported mainly by river to the refinery in Manaus. Petrobrás, the partly state-owned oil company, and federal and

Figure 3
Location of the Urucu Pipelines and Belo Monte Dam in Brazilian Amazon



state governments have been interested in investing further to develop the Urucu natural gas reserves since the late 1980s. The plans would support scaled-up production to between 4 and 5.5 million m^3 (or 900 to 1000 MW of electricity), which would last up to 50 years (Wertheim, 2004).

The pipeline project emerged in late 1988 when Petrobrás, the state government of Amazonas, and the Ministry of Mines and Energy were looking for a solution to the chronic problem of supplying energy to Manaus and areas in the western Amazon. The proposed project has taken different forms since it was first considered. Initially it was a fairly simple project whereby the gas would be transported by pipeline to the Tefé River and from there by river barges to Manaus. Beginning in 1992, there was a conscious decision by the federal government, prompted by Petrobrás, to increase the scope of production in that area and to invest in large-scale infrastructure to make that possible.

Two alternatives were put forth at that time: (a) The gas could be transported by pipeline all the way to Manaus, or (b) the gas could be transported to Coari where it would be transformed into liquefied natural gas (LNG), and then transported by barge to Manaus and Porto Velho, and reconstitution plants would be built in both locations. These alternatives were the result of a preliminary study commissioned by Petrobrás and carried out by a consulting firm (Internacional Engenharia S.A. [IESA]). The study determined that both alternatives would be preferable to building a hydroelectric plant near Manaus (Gawora, 2003; Wertheim, 2004).

In 1995, the newly elected Cardoso administration began considering projects that would integrate the portfolio of its Brasil em Ação program (Brazil in Action). One of the objectives of that program was to expand transportation, energy, and communications infrastructure in the Amazon. Petrobrás seized the opportunity and proposed a more ambitious project, which combined the two options proposed by the 1992 IESA study. The proposal suggested two pipelines be built, one going north from Coari to Manaus (417 km) and one going south from Urucu to Porto Velho (538 km), in addition to building a liquefying plant in Coari that would serve the cooking fuel demand for the northern region and adjoining states (Gawora, 2003; Rosas, 2003).

Petrobrás expanded the project to increase its chances of having it included in the Brasil em Ação program, and thus have it funded and implemented. Given competing plans to expand electricity generation in the north (e.g., the proposed Cachoeira da Porteira hydroelectric plant, a link to the Guri transmission line allowing import of Venezuelan electricity, a link to the Tucuruí system, and the proposed Belo Monte and Madeira hydroelectric plants), the project had to justify its costs (Gawora, 2003).

The estimated costs for this expanded version of the project were at the time approximately $1.7 billion, with roughly $500 million estimated for both pipelines (Petrobrás, 1998). The argument put forth by Petrobrás has been that these costs would be defrayed by a decrease in subsidy costs for the oil-based thermal energy currently used in the region (approximately $365 million/year; “Construção do Gasoduto Obtém Licenciamento Oficial,” 2004). Generation costs in Manaus would decrease from the current $100/MW/hr to approximately $30 (“Um Gasoduto no Meio da Selva,” 2003). Since then, the estimate has increased to $875 million for the pipelines ($428 million for the Coari–Manaus line and $343 million for the Urucu–Porto Velho line; “Custo dos gasodutos sobe após crise na Boliva,” 2006).

Throughout this process, Petrobrás has been the main actor in the coalition promoting the construction of the Urucu pipelines. As the agency responsible for oil and gas development in Brazil, it took charge of developing the project, presenting it to the federal government, placing it in the government’s energy development agenda, and defending it as the most viable alternative. Petrobrás’s vested interest is apparent not only from its determined defense of the pipeline project but also from its responsibility for rallying support for the project within the government and recruiting additional funders and supporters within the private sector. As part of its strategy

to pursue this project, Petrobrás has avoided any public discussion of alternatives and has insisted that the government continue to focus on the pipelines as they are currently projected, in spite of clear risks and environmental costs.

This strategy worked for Petrobrás, for it secured the support of the federal government in general, as signaled by the inclusion of the projects in the Brasil em Ação program in 1995, and later in Avança Brasil. In addition, the Ministry of Mines and Energy has become increasingly supportive of the project because it sees it as a way to increase energy supply to Manaus, which, given its isolation and dependency on thermal energy, has one of the highest energy generation costs in Brazil (Lima & Goy, 2006).

Petrobrás has also sought support from a combination of public and private sector actors for the project. Many of them now have a financial stake in it, including the National Development Bank of Brazil (BNDES), which is financing 60% of the Coari–Manaus pipeline, Japan's Exim Bank (which already had financed $64 million in the Urucu gas refinery in Coari), Halliburton, Schlumberger, and El Paso Energy International. The main financing source for the Urucu–Porto Velho pipeline is TNG Participações, controlled 50% by Petrobrás, 25% by El Paso, and 25% by CS Participações. The main partner in CS Participações is Carlos Suarez, a former associate of Enron in Brazil and part owner of Termonorte and Construtora OAS—a large contractor with a history of questionable dealings with the Brazilian government. TNG Participações has taken over Gaspetro's (a Petrobrás subsidiary) original licenses and construction rights to the Urucu–Porto Velho pipeline (Amazon Watch, 2001; Friends of the Earth Amazonia [FOE Amazonia], 2004a, 2004e).

Opposition to the Urucu projects was a reaction to the known environmental and social impacts of a small pipeline segment (from Urucu to Coari) built in 1997. The fear of opposers was that the environmental costs of building additional pipelines through an intact forest area populated by several indigenous peoples, including many isolated groups, would be severe. Among the documented impacts of the existing pipeline that goes to Coari are increased access into deep forest areas; water pollution; increased river traffic and commercial fishing (due to deepening of channels); migration; and impacts on local population, including child prostitution, AIDS, drug trafficking, domestic violence (Gawora, 2003). Indirect effects came from migration (mainly from relocating workers and increased access), illegal mining, timber extraction, deforestation resulting from increased access to the area, and undesirable contact with vulnerable indigenous populations.

At the core of the policy coalition opposing the Urucu pipelines were local and international nongovernmental organizations (NGOs), including Friends of the Earth (FOE); Fórum Permanente de Debates da Amazônia (FORAM); Fórum das ONGs de Rondônia; Instituto Socioambiental (ISA); Environmental Defense (ED); and as well as the Pastoral Land Commission (CPT), an organization of the Brazilian Catholic church; and indigenous rights groups such as Coordenação das Organizações Indígenas da Amazônia Brasileira, Coordination of the Indigenous Organization of the

Brazilian Amazon (COIAB), Missionary Indigenous Center (also affiliated with the Catholic church [CIMI]), and the Organization of Indigenous Peoples of the Middle Purus (OPIMP; Amazon Watch, 2001; FOE Amazonia, 2002; Gawora, 2003). Led by FOE, these institutions orchestrated a media campaign against the projects beginning in 1999.

Like the dominant coalition, this is a fluid alliance of actors with diverse interests and strategies. In 2001, the attorney general (*ministério público*, MP) of the state of Amazonas, and the Amazonas state government, joined in opposing the project. In 2002, the Amazonas MP filed a lawsuit against Gaspetro (Petrobrás's subsidiary) and other companies associated with the projects, including El Paso. The lawsuit, filed shortly after Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) granted Gaspetro the preliminary environmental license (*licença ambiental prévia*) for the project, alleged that the preliminary environmental license for the Coari–Manaus pipeline that had been granted by the state did not fulfill legal requirements and that the study for the Urucu–Porto Velho pipeline was extremely deficient in the description of true impacts of the project. The lawsuit forced public hearings and managed to temporarily stop construction of the Coari–Manaus pipeline, and suspend the license through a temporary judicial injunction (FOE Amazonia, 2002; Gawora, 2003). The basis of the lawsuit was that no alternatives were presented or compared in terms of cost and/or benefits and environmental impacts, and this is a prerequisite for environmental licensing in Brazil. Critics also pointed out that the environmental impact studies (Estudo de Impacto Ambiental/Relatório de Impacto Ambiental [Environmental Impact Study/Report of Environmental Impact]; EIA RIMA) conducted by the Federal University of Amazonas (UFAM) for the Coari–Manaus segment, and Cepemar (a private consulting firm) for the Urucu–Porto Velho segment, had several flaws including the poor quality of the environmental diagnosis, the small size of areas that were sampled for affected species, and the lack of assessment and discussion of the probable impacts on the indigenous and traditional populations that would be affected (FOE Amazonia, 2002; Gawora, 2003). The public pressure and lawsuit led to a series of public hearings held in 2002 and resulted in 14 recommendations for mitigation of impacts.

In April 2003, the MP submitted a request to the federal court seeking the suspension of the temporary environmental licenses for the Urucu–Porto Velho pipeline, granted by IBAMA in 2002, and for the Coari–Manaus pipeline, granted by Instituto de Proteção Ambiental do Amazonas (Institute for Environmental Protection of Amazonas; IPAAM; the state licensing agency) in 1992, until both projects were in compliance with the recommendations made during the August 2002 hearings. A federal court in the State of Amazonas accepted the request and suspended the licenses, and at the same time named IPAAM as the competent agency to deal with licensing the Coari–Manaus pipelines because most of the effects were within the state of Amazonas, and it named IBAMA as the competent agency to license the Urucu–Porto Velho because it crosses state lines (Amazonas to Rondônia). As a

result, the work on the pipelines stopped for a year between April 2003 and May 2004 (FOE Amazonia, 2004c).

The lawsuit brought by the opposition coalition was supported by the Amazonas state governor at the time (Amazonino Mendes) and his administration, who opposed building a pipeline, primarily because they favored the use of barges that would allow the state to collect additional taxes (the Imposto sobre Circulação de Mercadorias e Prestaçao de Serviço [tax on merchandise circulation and services; ICMS] is a tax based on the circulation of goods and services; 25% of the collected amount goes to the state government).

Given the lack of progress in May 2004, his successor, Governor Eduardo Braga, made an agreement with Petrobrás/Gaspetro and reinstated the licenses. As part of the agreement, Gaspetro and TNG Participações established funds of $3.3 million (R$11 million) managed by the state of Amazonas to mitigate the impact of the Urucu–Porto Velho pipeline, and an agreement between Petrobrás/Gaspetro and the state of Amazonas established a "sustainable development" program for the area affected by the Coari–Manaus area with costs of R$42 million (approximately $14 million) to help finance alternative development in affected areas (for details of the agreements, see Government of Amazonas, 2005; FOE Amazonia, 2004). In exchange, the state government and the MP removed the lawsuit against the project on April 21, 2004, dropping their opposition to the project ("Construção do Gasoduto Obtém Licenciamento Oficial," 2004; FOE Amazonia, 2004e). At the same time, IPAAM gave the go-ahead for the environmental license for the Coari–Manaus pipeline (Almeida, 2004; FOE Amazonia, 2004c; "Gasoduto vai Atender 310 Famílias em Coari e Codajás," 2004; "Paricatuba é Ponto de Partida do Gasoduto," 2004).

Governor Braga, his environment secretary (Virgílio Viana), and the MP, in effect, left the coalition opposing the pipelines, thus preempting its main goal of blocking the project. This decision was partially rooted in local politics, first, because there was strong support for this project in Amazonas, among both the general population and politicians. Second, Governor Braga was interested in lowering energy costs to increase his support within the private sector and in pursuing concrete development alternatives for a chronically poor state. The Amazonas government approached Petrobrás with a win-win solution, which addressed Manaus' chronic energy shortage and mitigated some of the project's environmental and social impacts (for details, see Governo do Estado do Amazonas and Petrobrás, 2005).

Social movements and NGOs at the core of the coalition protested that the terms of the agreement did little to address the flaws of the EIA-RIMA and that the agreement and reinstatement of the license had not been discussed with grassroots groups and other interested parties. They also argued that there were a number of viable alternatives to the project, with significantly less environmental impact (FOE Amazonia, 2004d; Gawora, 2003). Among the alternatives were (a) the use of barges to transport liquefied gas from Coari, as initially planned (however, the volume of

barge traffic on the Solimões River would have been problematic as well), (b) importing energy from the Guri hydroplant in Venezuela because there already was a power line between Manaus and Boa Vista bordering the BR-174 road that could be extended, and (c) a link to the Tucuruí power line, which already went to Santarém and Itaituba and could be extended to Itacoatiara and from there to Manaus (Amazon Watch, 2001; Gawora, 2003).

After the agreement was in place, the opposing coalition sought the support of the MP federal (federal attorney general) in January 2005; however, it was too late. Although a federal court initially accepted an injunction requesting suspension of the work on the Coari–Manaus pipeline on January 19, 2005, it was decisively rejected in an appeal 2 days later.

Since then the work has progressed, although more slowly than anticipated because of the difficulty Gaspetro is having in negotiating construction prices with subcontractors who have organized as a consortium. The final cost of the project is now estimated at $19 million for the Coari–Manaus segment and the conclusion of the project may be delayed until 2008 (Menezes, 2006).

The success of the opposing coalition in blocking the project depended on the support of state government and the state MP. When these two key supporters and IPAAM negotiated an agreement with Petrobrás/Gaspetro, the remainder of the coalition lost its ability to delay construction of the pipelines.

As previously hypothesized, there are three factors that explain this outcome: (a) There is significant power asymmetry between the dominant and opposing coalitions, and central actors are unresponsive to public demands; (b) the potential gains from the project make the dominant coalition more willing to face opposition; and (c) the strategy of opposing coalition contributed to this outcome.

The main coalition is composed of political insiders and government agencies with ample access to government cadres and inside information. This has given them an advantage in agenda setting, and resources for implementation. This asymmetry, and the fact that Petrobrás and Gaspetro are insulated bureaucracies with significant ties to government and private actors, and that the pipeline project has gained support at a moment when energy generation is very present in the Brazilian's government agenda, has reduced the project's susceptibility to political pressure even more.

This dominant coalition is willing to face the opposition, even in the long run, because (a) the financial gains at stake are large for the construction phase and the distribution of gas (El Paso and TNG Participações control 75% of the energy consumed in Amazonas through its four thermal stations, and through two thermal stations in Rondônia; it also monopolizes energy generation there [FOE Amazonia, 2004a, 2004e] thus being able to set prices higher than the national average); and (b) the project can be at least ostensibly justified by the accrued savings in generation costs.

In contrast, the fairly weak opposition coalition is trying to raise environmental and social concerns in a context where key actors are more interested in meeting the country's energy demands. The strategies adopted by the core actors of the

opposing coalition centered mainly on a public awareness campaign through the media (see FOE Amazonia, 2004b; ISA, 2003), with additional pursuit of a lawsuit filed by the MP. This may be because other strategies, for example, consensus building among stakeholders, are too difficult or costly to pursue. However, campaigns and lawsuits are unlikely to lead to blocking the project given the low susceptibility of dominant coalition players, which extends the process longer than the public attention span, and because they do not adequately address the local political context. Although gaining initial support of the state government of Amazonas and the state MP, key to keeping the project from being implemented, the opposing coalition did not make a concerted effort to engage local stakeholders generally (other than social movements defending indigenous rights). For instance, they did not establish a dialogue with the state licensing agency or the university, which carried out the environmental impact studies, nor with the legislature and potentially sympathetic politicians. The state government and the state MP function in this local context are very affected by local politics and political cycles that provided an incentive to settle as soon as possible.

This is not to say there were no positive results. An agreement was reached between the state government, Petrobrás, and Gaspetro, which mitigates some of the direct environmental and social impacts of the project.

The Belo Monte Hydroelectric Dam

The Belo Monte Dam and hydroelectric generation plant was first proposed by Eletronorte, a state-owned utility company, in 1975, and its initial design was based on two initial dams in the Xingu River (Babaquara and Kararaô). Originally, the combined area to be flooded was estimated at 14,500 km^2 (Pinto, 2003), and the complex would have five generating plants along the Xingu River with the capacity to generate 14,700 MW (Fearnside, 1995). Based on that plan, an entire indigenous reserve (Paquiçamba) would be flooded, and some 6,000 people would need to be relocated. However, these two dams would be just the first phase of Eletronorte's overall plans, which proposed to build up to four additional dams (Altamira, Ipixuna, Krokaimoro, and Jarina), flooding a total area of 22,000 km^2 in the Xingu basin, and directly affecting 12 indigenous groups (Pinto, 2003; Fearnside, 1995, 2005b; Little, 2003; see Figure 3).

The environmental and social impact of the original plan was such that it led to extensive mobilization at the grassroots level (especially among the indigenous organizations in the Xingu), and national and international NGOs. Together, they organized a media campaign and lobbied the World Bank—the main funding source for the project—and European and U.S. governments regarding the environmental and social impacts of the project. In 1989, the indigenous peoples in the Xingu organized a meeting that brought more than 1,000 participants to Altamira, including 600

indigenous people, Brazilian government officials, foreign journalists, celebrities, and NGO representatives. In a now-famous moment, a Kayapó woman threatened the Eletronorte representative with a machete. The mobilization generated international pressure and led to condemnation of the extensive flooding of a sensitive tropical ecosystem and indigenous lands that damming the Xingu, a high-volume river with great seasonal variability, would cause (Hildyard, 1989; Little, 2003). The timing of this alliance between environmentalists and indigenous people, at a point of heightened visibility for both these movements, and at a crucial moment for the World Bank that was under much international pressure for its poor environmental record, led to the cancellation of the loan to Eletronorte.

Without the World Bank loan and support, Eletronorte had difficulty securing funding for the project, partly because of its track record in going over budget in hydroelectric projects in the Amazon, including Tucuruí and Balbina, and partly because of the international pressure generated by the grassroots campaign. Given Brazil's overall economic situation in the late 1980s, under the burden of the debt crisis, the federal government was in no condition to finance the project on its own. The environmental opposition considered it a victory that the project was removed from the government agenda.

Analysts have repeatedly made the point that there are better alternatives to Belo Monte that would cost less and yield better results. The main suggestions are (a) optimizing the transmission systems in Brazil that currently have losses of 15% of transported energy; if that were reduced to internationally acceptable standards of 6%, that would save approximately 6500 MW; and (b) revamping older hydroelectric plants (20 years or older), investing in small hydro plants, and investing in wind-generated energy; and cogeneration using sugar cane residue (Bermann, 2002a, 2002b; Buarque de Hollanda & Poole, 2001; Sevá, 2005).

Even in the face of opposition, the Brazilian government continued to consider the project crucial and strategic because it would allow the integration of the Amazon into the national energy system. The project has gained new life since 1998, when Eletronorte revised the project of the former Kararaô Dam, now renamed Belo Monte, decreasing the area flooded to 400 km^2 and increasing generation capacity to 11,000 MW. The new design opted for two smaller dams: one on the main river channel forming the main reservoir (Sítio Pimental), from which the water would then divert through two channels to a second dam. The generation plant would be at the end of this second dam (see Eletronorte, Eletrobrás, Ministério de Minas e Energia, n.d., and Figure 3). This design would eliminate the need to flood the Paquiçamba indigenous area.

According to critics, two problems remain in the revised project. First, the dam would operate without a sizeable reservoir, which means that during the dry season it will be subject to shutting down, reducing its firm generation capacity to below the 50% threshold considered viable for similar projects. Second, the project proposed a rather extensive transmission line that would have large costs and would decrease efficiency (Pinto, 2003; ISA, 2003; Sevá, 2005).

More recently, during the Lula administration, the project has been revised once again, with its capacity reduced to somewhere between 5.5 and 7.5 MW, at an estimated cost of $3.7 billion, and energy generating costs estimated between $12 and $20/MW. However, many experts believe that amount, well below Brazil's average cost of $35/MW, to be too optimistic and the true cost to be between $28 and $41/MW given that it would operate much below capacity for most of the year because of the rain regime in the Xingu (ISA, 2003; Little, 2003). Another revision has been in the transmission lines, which has been reduced to three lines of 800 km each carrying 750KV. These lines would join the national grid near Colinas in the state of Tocantins (Eletronorte, 2002). The cost of this element of the project was estimated at approximately R$2.14 billion ($900 million, Pinto, 2003; Eletrobrás, 2002). Bermann (2002b) estimated the costs of the project to be closer to $11 billion, including transmission costs.

The main environmental problem that remains is not a part of the project per se but rather associated with it. To make the project economically viable, more upstream dams would be necessary, and there is already admission by the government that the possibility of these dams cannot be discarded as an option for the future (ISA, 2003; Sevá, 2005). Fearnside (2005b) believed that at least one more dam is planned by Eletronorte (Altamira, formerly Babaquara) and possibly four more (Ipixuna, Karaimoro, Iriri, and Jarina). His conclusions are based on activities by Eletronorte engineers and crews in these locations, although no statement has been made by the company on whether it is still pursuing those dams as options (Fearnside, 2005b).

Besides Eletronorte and Eletrobrás, state-controlled utilities, and the Ministry of Mines and Energy (MME), there are a number of private companies that are interested in participating in the implementation and funding of the project, with Eletrobrás and its three subsidiaries, Eletronorte, Chesf, and Furnas, financing somewhere between 30% to 49% of the costs and the private sector financing 51% to 70%, part of which would be financed by BNDES loans (Coimbra & Martinez, 2003). A number of these companies have formed a consortium, Consórcio Brasil, including two heavy construction companies, Andrade Gutierrez and Camargo Correa, and multinational equipment and electronic component manufacturers such as Alstom, ABB, General Electric, and Voith Siemens (Coimbra & Martinez, 2003). In addition, Alcoa/Albrás has also voiced interest in the project given its intensive use of energy in aluminum/alumina manufacturing (Pereira, 2004).

It is not clear what the direct impacts of Belo Monte would be because the reservoir area is relatively small (400 km^2); however, it would strongly affect at least nine municipalities (Eletronorte, 2002). The main concerns regard changes to the water regime of the Xingu. For instance, the town of Altamira would likely suffer from more frequent floods, and fisheries would be affected, as would the local population whose livelihoods depend on them. Greenhouse gas emissions increase substantially in tropical dams (Fearnside 1995, 2001, 2004). Indigenous populations including the Assurini, Arawetê, Parakanã, Kararaô, Xicrin do Bacajá, Arara, Xipaia, and Kuruaia, and their lands, would suffer direct and indirect impacts from the project (ISA, 2003;

Sevá, 2005). Although some villages may need to be relocated altogether, many thousands of people from indigenous and traditional peoples are likely to be strongly affected because their livelihoods depend on the river access they would lose during the dry season.

The long-term impacts of the project would also include the increase in migration to the area, similar to what happened in the eastern Amazon during the implementation of large-scale projects such as Tucuruí and Carajás, and the expansion of agricultural and economic activities—especially timber extraction and cattle ranching, which are the main drivers of deforestation in Brazilian Amazonia (for projections, see Little, 2003; Sevá, 2005).

The Transamazon is already an area plagued by much rural violence and tension over land tenure and access to natural resources. The assassination of two local grassroots leaders, Dema Federicci in 2001 and Sister Dorothy Stang in 2005, show that there is already an explosive situation on the ground that would not be helped by a rapid growth through migration to the area. Although most of the costs (environmental and social) of Belo Monte will be concentrated in the Xingu basin, in contrast, the benefits will be diffuse and will serve primarily the growing demand for energy in southeastern Brazil's economy.

Following the success of the mobilization in the late 1980s, current resistance efforts have encountered difficulties and failed to have significant effect on the government's resolve to build Belo Monte. This is partly because of changing political circumstances and partly because of Brazil's need for increased energy generation since 2001. The change in the political context of the project is partly because of the loss of the World Bank as a focal point in the campaign, and partly because of the redirection of the indigenous movement efforts toward demarcation and protection of indigenous lands (Keck, 2002; Little, 2003).

However, there have been attempts at mobilization to stop Belo Monte since 2001 (ISA, 2003) with the participation of national NGOs such as ISA, the International Rivers Network (IRN) Brazil, FOE Amazonia, and grassroots organizations through the Movimento pelo Desenvolvimento da Transamazônica e Xingu (MDTX), an umbrella organization representing the interests of 113 regional organizations in the Xingu region, social movements such as the regional branch of the Movement of People Affected by Dams (MAB), and indigenous rights organizations including COIAB and CIMI. Nevertheless, attempts at mobilization reveal a more diffuse coalition and less visible action than what was achieved in 1989.

The opposing coalition has made three central arguments: (a) The expected impact of the project on the livelihoods of indigenous and traditional peoples along the Xingu and its tributaries, as well as more diffuse environmental and social impacts throughout the Xingu basin and Transamazon area, are all unacceptable; (b) there are significant flaws in the EIA-RIMA that was produced by Fundação de Amparo e Desenvolvimento da Pesquisa (FADESP), the research foundation of the Federal University of Pará, as well as in the fact that FADESP was hired through

procedurally illegal means (ISA, 2003); and (c) most important, the environmental and social costs of the project are unjustifiably high because energy generation during the dry season will be so low as to make the project unsustainable, especially when considering the native forest area that will be flooded, the impact on fisheries and endemic species, and the social costs to indigenous populations and other riverine communities.

Although the key objection to the project is based on its heavy impact and uncertain economic returns and generation capacity, what has delayed the project is a lawsuit initiated by the MP of the state of Pará based on three procedural points: (a) The consultancy hired to carry out the environmental impact statement was hired illegally, without competing bids; (b) the environmental license was issued by Secretaria Executiva de Ciência, Tecnologia e Meio Ambiente (SECTAM), the state environmental agency of Pará, which did not have purview over a project that affects two states and indigenous lands under federal control; and (c) any project that affects indigenous lands needs previous authorization from Congress before any work is undertaken, including the environmental impact statement.

The lawsuit went all the way to the Supreme Court, and the decision to stop the project until the irregularities are addressed has been upheld. In the meantime, Eletronorte has sought to bypass this by seeking congressional permission, as it has announced that it might go through the process of calling for bids for a new environmental impact study. In late 2003, the government announced that it would start the process over again by commissioning a new environmental study for licensing by IBAMA in a parallel effort to get the project moving ("Marina: Estudos para Construção," 2003). In July 2005, Eletrobrás managed to gain support from both houses of congress, and a Legislative Decree (DL 788, July 12, 2005) was enacted authorizing the construction of the Belo Monte complex. The process has forged ahead, and public hearings organized by IBAMA as part of the licensing were scheduled for March 2006. Nevertheless, a petition previously filed by opposing groups with Brazil's solicitor general representative in Pará (Procurador da República, Mr. Felício Pontes) was accepted by a court in Altamira, which declared the process unconstitutional because of failure to consult the affected indigenous communities before the licensing. In March 2006, a new measure was introduced in Congress to eliminate the constitutional requirement of preliminary congressional approval for any hydroelectric projects in indigenous lands ("Projeto Regulamenta Hidrelétricas," 2006).

Throughout this legal battle Eletronorte and the MME continue to count on the implementation of Belo Monte and have announced that they will probably begin the process of bidding for the public-private partnership (PPP) consortium in 2006, despite the remaining uncertainties ("Belo Monte Sai Até 2006," 2005; "Pacote de Oportunidades," 2005; Pinto, 2005).

Eletronorte is the main player in the dominant advocacy coalition, with support from Eletrobrás and the MME. Eletronorte, like Petrobrás, operates as a state-owned company of mixed capital and remains fairly insulated from pressure by opposing

interests. So far, social movements have repeatedly protested that Eletronorte has not opened the process to input from civil society despite the importance and scale of the project, and existing legislation on water issues, which mandates public participation, and the guidelines by the World Commission on Dams have been ignored by the company (ISA, 2003; Little, 2003; Sevá, 2005).

There are a few similarities between the Belo Monte and Urucu cases. The first is power asymmetry. This dominant coalition, too, is composed of political insiders and government agencies with access to agencies and bureaucrats, financial resources, and technical cadres. Eletronorte is extremely insulated from public pressure in its capacity as a power supply monopoly in the eastern Amazon and has strong ties to government and the private sector. The MME is the agency in charge of setting energy policy. Access to these resources has enabled the dominant coalition to pursue its agenda during a 20-year period, even after the initial defeat by the opposing coalition.

Second, this access to resources and decision-making power has allowed the dominant coalition to wait for a favorable political moment to revamp the project and present it at a time when much of the Brazilian public perceives a need for sacrifices to address energy shortage. This mirrors the situation in the Urucu case, when the dominant coalition used energy shortage to justify a project it already had in mind.

Unlike the case of Urucu, the economic gains in Belo Monte are less clear at this point because the returns on the investment are still subject to much dissent (estimates of total costs and cost of generation vary widely) and although there are private companies, such as the Consórcio Brazil, mobilized to profit from construction, the project has not been awarded to any specific partnerships.

Finally, there is the issue of the strategy adopted by the opposing coalition. In the late 1980s, the coalition was successful, partly because the World Bank was a target of the campaign, and was susceptible to external pressure. In the second phase of the campaign, when the World Bank is no longer involved, and the political climate has shifted because of the perceived need for solutions to the energy shortage, the results will not be so clear. The second phase of the campaign resembles more closely the case of Urucu, also based on a public awareness campaign and a lawsuit filed with the support from the MP (see FOE Amazonia, 2004; ISA, 2003). Again, the low susceptibility of the target has led to a protracted battle and modest results.

Although there has been greater effort to involve state and local actors in the opposition, unlike Urucu, this effort is not as concerted and institutionalized as the overall public awareness campaign. Local actors in Altamira have been very involved in the effort because of expected local impacts (see Sevá, 2005). At the state level, there is less involvement of relevant stakeholders, including politicians, the university, state agencies, and the governor. A hearing organized in the state legislature in March 2006 had only one state representative in attendance (Airton Faleiro). Part of the reason for the lack of greater involvement of actors at the state level is that there is strong support for the project elsewhere in Pará.

The limited success of the opposing coalition to Belo Monte is dependent on the support of the state MP and the solicitor general representative in Pará. The arguments of the opposing coalition are strong, and the project is very problematic environmentally and socially, with less costly alternatives available. However, given the perceived importance of the project for the federal government, and the private actors interested in implementation, the project is unlikely to be removed from the government's agenda. The feeling among analysts and government is that it is just a matter of time for Belo Monte to become reality (C. Bermann, personal communication, January 2004; M. Ximenes, personal communication, July 2005).

Although there are few incentives in place for a compromise between the two coalitions, perhaps refocusing the opposition along two lines might yield more modest, but concrete, results. The opposition could propose a negotiated solution with Eletronorte whereby a revised and improved Belo Monte would go through, with independent international oversight of the licensing and implementation process, along with a legally binding promise not to build additional upstream dams. In addition, the opposition might recast its campaign at the federal level more broadly, emphasizing energy conservation strategies and energy development alternatives to hydropower as key strategies for Brazil's energy development agenda.

Concluding Comments

Because of the chronic energy shortage that Brazil has been facing since 2001, the government is under significant pressure from the public and private sectors to address a potential energy supply crisis in the near future. Energy supply security will require expansion of power generation capabilities and measures to control energy consumption. The situation has been used as a justification for pushing energy generation policy options with high environmental and social costs, including large hydropower plants in the Amazon and increased use of natural gas, rather than more sustainable energy sources. There has been vocal public opposition to many of the proposed projects for several resons, ranging from environmental impact, to high generation costs, to social displacement.

In the two cases analyzed in this article—the Urucu pipelines and the Belo Monte Dam project—the opposition has consisted primarily of environmental NGOs, social movements, and grassroots organizations. They have (a) attempted to raise awareness of the social and environmental costs associated with these projects through media campaigns and (b) used legal means (lawsuits and court injunctions) to stop the proposed projects or change their designs. These strategies have had limited success, however. While these groups have managed to frame the issues and raise awareness among the public, they have failed to achieve lasting results.

This article has identified the key reasons for the only limited success of opposition groups. First, and quite obviously, there is power asymmetry between proponents

and opponents of energy projects, which favors the dominant economic interests, who are advocating expansion of energy supply and exploration despite environmental and social costs. Second, many of the dominant actors stand to profit greatly from the realization of these projects, while they are largely insulated from public pressure. This makes them poor targets to the kind of activism strategy adopted by the opposing coalitions that focus on generating public support for blocking the projects. Although the pursuit of action through the court system has been more successful, court decisions are not likely to yield long-term political solutions.

Lessons learned from these two cases will be important for environmentalists concerned about other large-scale projects that are being considered, including the construction of the Madeira dams and a Transcontinental pipeline that would link Venezuela and Argentina, and would cut through Brazil. What follows are comments based on the lessons learned from the Urucu and Belo Monte cases. First, there is a need for opposition coalitions to develop an integrated approach to energy policy that recognizes the broader socioeconomic and political contexts all these projects have in common. Rather than dealing with these projects on a case-by-case basis (or crisis-by-crisis basis), it would make more sense to engage energy decision makers in a continuous dialogue regarding energy development in Brazil, and the broader consequences of different alternatives. Bermann (2002a, 2002c) and Fearnside (2004, 2005b) noted that energy policy per se has not made it onto the agenda of the dominant environmental organizations in Brazil. The current energy crisis may be an opportunity to engage a broad range of interested actors in the search for conservation measures and policy alternatives, including the creation of incentives for development of alternative energy sources. However, so far efforts to develop such a dialogue are limited.

Second, there is a need to take into account the local and state political contexts and to reach out for support from stakeholders at these levels. As noted by Keck (2002), it is a common mistake made by environmental organizations to fail to sufficiently involve local interests. The policy advocacy coalitions involved in Urucu and Belo Monte did not make concerted efforts to engage key stakeholders, including legislatures, universities, and state licensing agencies. And when they did enlist their support, little was done to incorporate their disparate political agendas and priorities into the coalition's overall strategy.

Finally, to arrive at lasting policy solutions, there will be a need for dialogue between coalitions. For the most part, the environmental movement, not only in Brazil, has limited its strategy to achieving optimal results, that is, to outright block projects and remove them from the government agenda for good. This has meant that these groups have often considered it a waste of time to seek out opponents to make their case and to try to develop mutually acceptable alternatives. In the political context of energy development in Brazil, it is however very unlikely that these projects can be completely avoided even though they are environmentally and socially costly. Negotiating better project designs, oversight mechanisms, and general environmental

and social safeguards may not be the optimal solution in the view of many environmentalists. But it may be a more realistic strategy that ultimately can produce at least some important environmental protection results.

Notes

1. For a discussion of alternative energy sources for Brazil, see the International Rivers Network Web site: www.riosvivos.org.br/, also Instituto Socioambiental's Web site: www.socioambiental.org/esp/bm/alt.asp; also Bermann (2002b), Gawora (2003), and Sevá (2005) presented analysis of alternatives for the two case studies included here.

2. For a summary of the rationing episode (Apagão) history, see de Araujo (2001) and "O Racionamento e a E & E," (2001).

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