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Development, dams and Dilma: the saga of *Belo Monte*

Introduction

The proposed *Belo Monte* hydropower dam complex on the River Xingu in Brazil's Amazon region is the second largest in the country, and the world's third largest in terms of installed capacity (11,200 megawatts) after *Itaipu* and the Three Gorges Dam in China. As the focus of intense conflict for more than three decades, even while still on the drawing board, *Belo Monte* is emblematic of the continuing struggle between the competing demands of Brazil's rapidly modernising economy and the conservation of its forests and natural resources.

This confrontation has been overseen by successive government administrations since the project was originally conceived in the 1970s, a mantle now inherited by Dilma Rousseff, and one that will no doubt be passed on to her successor(s) through this and other hydro-schemes planned for the Amazon. As Minister of Mines and Energy under President Luiz Inácio Lula da Silva, Rousseff was famously bullish in her support for infrastructure building to accelerate the development process with (if her critics are to be believed) little apparent regard for the environmental and social impacts on Amazonia's rainforest and local populations.

During her initial months as President, however, she will have discovered that in executing such mega-projects the exigencies of all stakeholders, not just those of powerful politicians and national economic policy-makers, must be accommodated if turmoil is to be avoided, or at least ameliorated. *Belo Monte* thus serves as an instructive example of the potential dangers and pitfalls of top-down

planning and failure to incorporate provisions for adequate consultation, participation, compensation and comprehensive resettlement. Yet *Belo Monte* is by no means the first such case in Brazil, and it remains to be seen to what extent its lessons will be internalised and acted upon in the future.

For the present, however, rather like a medieval jousting tournament, the battle lines at *Belo Monte* have been firmly drawn. On one side is the powerful pro-dam lobby, comprising construction companies driven by commercial interests and an ideological commitment to such projects as symbols of modernization and development. This approach is supported by the Ministry of Mines and Energy (MME), the federal and regional electricity authorities (*Eletrobrás* and *Eletronorte* respectively), as well as numerous consulting firms, construction companies and academic interests, together with the international aluminum industry, all in the name of development.

On the other side, lances poised, is an increasingly vociferous set of local, national and global organizations defending the Amazon and its people from what is perceived as an all-out attack on the region by self-serving politicians and industrialists. Opponents include indigenous groups, the country's Movement of Dam-Affected People (MAB), conservation and environmental organizations and international anti-dam lobbies, including the Environmental Defense Fund (EDF), Friends of the Earth–Brazilian Amazonia, Greenpeace and the International Rivers Network (IRN), as well as environmentalist academics.¹ Some opponents are motivated by a visceral hatred of all such large infrastructure schemes as being, almost by definition, inimical to sustainable development. Other less extreme critics demand the introduction of appropriate safeguards to protect the

environment and guarantee the livelihoods and rights of affected populations as an integral part of the development process and not just as an afterthought.

Background

Belo Monte, originally known as *Kararaô*, was first planned in the 1970s, but was soon shelved due to controversy, only to be resuscitated in the 1980s by President Sarney. In 1989 a massive and now famous meeting was staged at the nearby town of Altamira, opposing proposals for the six-dam complex, which was part of ambitious plans published by the national power authority *Eletróbrás* to construct almost 300 dams by 2010.² The 'First Encounter of the Indigenous Nations of the Xingu' attracted environmentalists from all over the world, including Sting, the British pop star. This meeting drew international attention to the potentially negative impacts of the scheme and to the sheer strength of local opposition. The most dramatic single image to emerge from this tumultuous gathering was that of Tuíra, a female indigenous leader, angrily waving a machete in the face of engineer José Antônio Muniz Lópes (later President of *Eletronorte*), which had worldwide repercussions and probably influenced further postponement of the project.

A second feasibility study presented three options for a smaller complex based on a run-of-the-river model rather than the huge reservoirs envisaged in earlier plans. Under the latest design, two canals would divert water away from indigenous reserves into two reservoirs to prevent flooding. Electricity would be generated using three dams: *Belo Monte* (90 metres high/3,545 metres long), *Pimentel* (36/6,248) and *Bela Vista* (33/351), with two power stations at *Belo Monte* (generating 11,000 MW) and *Pimentel* (233 MW).

The total inundated area under these new proposals would be reduced from 1,225 to 440 square kilometres. Costing some R\$20 billion (US\$12 billion) *Belo Monte* is justified within the national 'Plan for Accelerated Development' (PAC) as essential for filling an estimated energy gap of 5–8 per cent a year, for both industrial and domestic purposes; notably to satisfy heavy, subsidized consumers such as the regional aluminum and iron and steel industries.³ Another justification given is to help avoid major blackouts, of which there were 91 in 2010, almost double the number experienced over the country during the previous year (*The Economist*, 12 Feb 2011).

Belo Monte is considered a flagship project of national modernization and development, which Lula promised would go ahead 'by fair means or foul' (*na lei ou na marra*). Yet President Lula's dogmatism has been matched by equally strong opposition from many quarters. A 'Second Encounter of the Peoples of the Xingu' in May 2008 and further protests in 2010 underlined continuing antagonism to *Belo Monte* and the development paradigm that it symbolises for many people. Following in the footsteps of Sting, film director James Cameron visited the site to express his concerns, and later released an anti-*Belo Monte* film.⁴ Other celebrities, such as former US president Bill Clinton and Arnold Schwarzenegger, have also publicly opposed the project; all to little avail so far.

In February 2010, Brazil's environmental control agency (IBAMA) granted a provisional licence approving the project impact assessment and giving permission for the project auction to take place in April of that year, which was won by the *Norte Energia* consortium. After this, local indigenous and community leaders warned of imminent violence, and *Kayapó* chief Raoni Metuktire openly

declared war on the project. The auction was subsequently cancelled by the office of the Federal Attorney General and the provisional licence cancelled on the grounds that the process was illegal and infringed article 176 of the Constitution by not taking due account of the impacts on indigenous lands. But this decision was itself annulled on appeal and the auction results were reinstated the same day.

In August 2010, President Lula signed the contract with the *Norte Energia* consortium, but project construction itself could not begin until IBAMA granted the installation licence. For this to happen, the consortium had to prove that it had met 40 environmental mitigation preconditions for the first environmental licence to be issued. Although many of these requirements had not been met, in January 2011 IBAMA granted a partial installation licence, and work began on setting up the construction site and clearing access roads. A month later, however, the Federal Public Prosecutor filed a lawsuit against *Belo Monte* and a judge blocked the project on the grounds that all preconditions had not been satisfied. Continuing the ding-dong battle, on 3 March 2011 a regional federal judge overturned this decision, allowing preparatory work to start immediately.

A month later, the Inter-American Commission on Human Rights (IACHR) of the Organisation of American States (OAS) officially requested that the licensing process for *Belo Monte* be suspended on the grounds that the free, prior and informed consent (FPIC) of traditional peoples to be affected had not been sought, and that this constituted a breach of their human rights. The Brazilian government tartly rejected this suggestion, responding firmly that, 'The hydroelectric scheme of *Belo Monte* should be seen as an important factor in regional and national socio-economic development, with positive impacts on national power-generating

capacity and, consequently, on Brazilians' quality of life' (República Federativa do Brasil, 2011) . To express her displeasure President Rousseff even went as far as withdrawing the country's ambassador to the OAS and threatened to suspend payment of its dues to the IACHR.

The human rights commission eventually withdrew its condemnation of Brazil's actions, and an environmental licence for the construction of *Belo Monte* was issued. Further legal challenges followed, however, and in late September 2011 a federal judge again ordered works to be halted, this time on the grounds that fish stocks on the River Xingu could be damaged. Yet given the determination of the Brazilian government to go to almost any lengths to push ahead with the project, it seems unlikely at the time of writing that the dam will be permanently stopped by a judicial challenge.

Potential impacts of Belo Monte

Hydropower, which currently meets 80 per cent of Brazil's energy needs, is often portrayed as environmentally benign and a fundamental prerequisite for the country's development. However, there are trade-offs whose costs are not usually incorporated into wider economic calculations by the vested interests behind such schemes as *Belo Monte*. Opposition to this and other dam projects has been voiced on economic, environmental and social grounds.

It is claimed, for example, that the economic efficiency of *Belo Monte* will be compromised by the fact that, due to seasonal fluctuations in river flow, the project will be forced to operate below capacity for much of the year. In order to be financially viable, it is suggested that further dams would have to be built

upstream to stabilize water supply for electricity generation. This would entail reviving earlier plans to build *Altamira* (formerly *Babaquara*), thus flooding a much larger area than *Belo Monte*, with dramatic social and ecological consequences. Furthermore, increased drought risk in the Amazon due to predicted climate change (as witnessed in 2005 and 2010) could compromise *Belo Monte's* power-generating capacity, making the scheme uneconomic. Funded largely by the Brazilian taxpayer through the National Bank for Economic and Social Development (BNDES), the cost burden of required subsidies would fall on the public (*Global Post*, accessed 13 May 2011).

Suspicious about the economic robustness of the project were aroused by the fact that major construction companies such as *Odebrecht* and *Camargo Corrêa* decided to pull out of the project auction. A last-minute consortium headed by *Queiroz Galvão* and the meat-packing *Bertin* group won with an unusually low bid, supposedly attracted by low rates of interest charged by the BNDES, which is covering 80 per cent of the dam's cost, as well as further guarantees from the government to cover unexpected additional costs should they arise (Branford 2010).

Considerations of economic efficiency aside, most inhabitants of the region around *Belo Monte* have good reason to be worried about the future. It is estimated that the project could displace upwards of 20,000 people from their lands and homes, reminiscent of the upheaval caused by construction of the nearby *Tucuruí* dam on the River Tocantins. Inaugurated in 1984, *Tucuruí* was the largest dam ever built until then in a tropical rainforest area and was designed primarily to

supply subsidised electricity to the aluminum complexes of *Albrás-Alunorte* and *Alumar* as part of the Greater Carajás Programme (Hall 1989: 4).

Some 35,000 people (60 percent rural), including six small towns, were displaced as 2,500 square miles of uncleared forest were inundated. Urban resettlement was not without its problems but went ahead reasonably well. However, rural resettlement provision was chaotic and badly planned. Those affected saw their livelihoods disrupted by inadequate and delayed compensation, the failure to provide alternative farmland, and many other problems. Social and environmental mitigation enjoyed low official priority within *Eletronorte*, but a series of local protests in the early 1980s by villagers and civil society groups managed to extract some further concessions in the form of new settlements, relocation and infrastructure provision.

Another valuable case is provided by two dam projects on the São Francisco River in Northeast Brazil (Hall 1994). At the *Itaparaica* hydropower scheme during the 1980s, and for the first time in Brazil, a vigorous social movement managed to win a comprehensive resettlement programme for 40,000 displaced people. This contrasted sharply with the earlier experience of the *Sobradinho* dam project a few hundred kilometres upstream, executed in the 1970s during a period of military dictatorship and authoritarian planning. Here, where there was no grassroots protest, 70,000 people were 'involuntarily displaced' from their homes, but compensation was far more selective and unsatisfactory compared with *Itaparica*, with many losing out altogether. These experiences have generated useful lessons about the potential power of popular demands to leverage

concessions from the authorities, especially in Brazil's current more politically open and democratic circumstances.

Another social dimension of *Belo Monte* concerns its impact upon indigenous groups, who are especially angry that a stretch of the River Xingu will shrink and adversely affect fishing and other natural resources upon which they depend. Large-scale population displacement will create many difficulties around providing fair and adequate compensation, rebuilding people's livelihoods, loss of assets and resettlement provision, not to mention violent confrontations along the way. The lives of local indigenous leaders have already been threatened, while one local farmers' leader and prominent anti-dam campaigner known as 'Dema' was murdered in 2001, a crime that went unpunished, like so many in these circumstances (Amazonia.org.br accessed 8 May 2011; Fearnside 2006). Altamira, it should be remembered, was also the region in which hired gunmen murdered the emblematic Sister Dorothy Stang in 2005 as she defended local peasant farmers against land-grabbers (Greenpeace, 2005).

While *Belo Monte* will create employment for over 18,000 laborers directly, and perhaps 25,000 jobs indirectly, there is also a wider multiplier effect. If the *Tucuruí* and *Carajás* experience is anything to go by, *Belo Monte* will act as a giant population magnet, attracting up to 100,000 migrants in search of work. This will fuel land speculation, placing pressure on fragile forest resources and creating major problems for the already overstretched economic and social urban infrastructure in towns such as Altamira. For example, IBAMA has estimated that *Belo Monte* could lead to the deforestation of more than 5,000 square kilometres of rainforest over a 20-year period (*Amazônia*, 25 April 2011). Flooding of the

rainforest will also reduce biodiversity stocks and alter fish migration routes. Decomposition of flooded vegetation may produce large quantities of methane, a powerful greenhouse gas, as foliage gradually decays under the rising waters, as has happened elsewhere in the region. These ecological impacts have been routinely documented in comparable Amazon dam projects such as *Tucuruí*.⁵ They are likely to be exacerbated by unregulated heightening of the dam water level ‘through the back door’ as the result of obfuscation and underhand tactics deployed by the pro-dam lobby.⁶

Wider implications of Belo Monte

The hotly contested debate about *Belo Monte* needs to be placed in a broader context, for the project is indicative not only of the model of development that was pursued under the Lula government but also of the way in which key decisions about development were taken and are still taken under the Rousseff administration. The PT came to power when state capitalism was widely discredited throughout the world, partly because of the collapse of the USSR in the late 1980s. Yet many strategic thinkers in the PT (including President Rousseff) had been revolutionaries in their youth and still defined themselves as ‘socialist’. While accepting that it was no longer feasible to think of the state owning the ‘means of production’, they believed that Brazil should learn from the success of other countries, particularly in Southeast Asia, where the state had played a key role in steering development. They were particularly impressed by South Korea’s ability to promote research and to patent new products and ideas, about which

they spoke admiringly in policy documents drawn up before Lula's inauguration in 2003.

As a result, the two Lula administrations (January 2003–December 2010) deliberately set out to increase the role of the state in the economy, believing that the neo-liberal reforms adopted by Lula's predecessor, President Fernando Henrique Cardoso, had given too free a rein to large economic groups, both national and international. However, rather than building up the state as a strong, autonomous power with its own separate interests, as would have happened under state capitalism, the Lula government decided, instead, to use the state machine to pour huge sums of money into a tiny, carefully selected group of companies so that they could become powerful corporations, broadly similar to the Japanese *keiretsu* and the South Korean *chaebols*. The objective was to create corporations that could compete as equals with the biggest companies in the world.

Again, somewhat surprisingly, the Lula administrations did not seek to influence decision-making in these corporations but merely to give them the economic clout to pursue their own interests. As some analysts have put it, 'Rather than the state assuming once again a key role in the economy, what we have seen is an alignment of the state to the dynamic and demands of large entrepreneurial groups with solid positions in the market before the Lula government.'⁷ In his article in this collection, Alfredo Saad-Filho has dubbed the term 'neo-developmentalism' for this new form of state intervention (Alfredo Saad-Filho 2011). He also points out that neo-developmentalism has not replaced neoliberalism but coexists alongside it.

One of the main ways in which the state has increased its presence is by beefing up the role of the BNDES, which was greatly strengthened, with loans increasing from R\$35.10 billion (US\$21.91 billion) in 2003 to R\$168.40 billion (US\$105.10 billion) in 2010. As a result, annual disbursements from the BNDES are today worth more than twice the combined expenditures of the World Bank and the Inter-American Development Bank.⁸ Since 2005, three-quarters of the loans have been channelled to big companies in sectors regarded as key by the government, such as mining, ethanol, paper and pulp, oil and gas, hydroelectric power and farming.⁹

It is largely thanks to this BNDES funding that giant Brazilian economic groups have been formed; examples include *JBS-Friboi*, which after a series of take-overs of other companies in the sector has become the world's largest beef processor, and *Brasil Foods*, formed from the merger of *Sadia* and *Perdigão*, which is today one of the world's largest food groups. Indeed, although the function of the BNDES is to promote the country's social development along with its economic development, only a tiny proportion of its resources are channelled into education (0.13 percent of disbursements in 2009), health and social services (0.3 percent), water, sanitation and rubbish collection (together 0.66 percent) (BNDES.gov.br).

The *Belo Monte* project is a good example of the role that the Lula government developed for the state sector. Even though BNDES is providing 80 per cent of the investment, the state does not control the project, deliberately deciding not to have a majority control in *Norte Energia*, the consortium that is building *Belo Monte*. The three state-owned companies in *Norte Energia – Centrais Elétricas do Norte do Brasil S/A (Eletronorte)*, *Companhia Hidro Elétrica do São*

Francisco (Chesf), and *Centrais Elébricas Brasileiras S/A* – together hold just under half (49.98 percent) of the voting shares, so they could be outvoted by the other shareholders, which are almost all big construction companies (Dams in Amazonia).

Since the state has aligned itself so closely with big capital, concerns have been raised about the kind of development the government is promoting in the name of the Brazilian people. In 2000 the BNDES played a key role in setting up the ‘Initiative for the Integration of South American Regional Infrastructure’ (IIRSA), a vast programme that seeks to integrate the different infrastructure projects in the South American region. Involving an investment of US\$55bn, it consists of ten integration hubs (*ejes* in Spanish; *eixos* in Portuguese), each with several corridors composed of highways, *hidrovias*, railways, and pipelines. Its main objective is not to promote interdependence among the South American countries but to make it easier and cheaper for the region to send abroad its agricultural and mining exports (Killeen 2007).

Eight of the 31 projects given priority are being carried out, and they all involve BNDES investment. Moreover, the Brazilian authorities are clearly taking advantage of IIRSA to make it easier for Brazilian companies to exploit natural resources in other countries and to promote the country’s energy security. In June 2010, for instance, the Lula government signed an agreement with the Peruvian government to build six hydroelectric stations in the region of *Inambari* in the Peruvian Amazon, where Brazilian companies are active. As much as three-quarters of the energy will probably be transferred to Brazil through transmission lines that will connect the projects in Peru with the hydroelectric stations of *Jirau*

and *Santo Antônio* along the Madeira river (*Andean Currents*, 2 April 2010). The BNDES, which is providing most of the finance, is doing little to respond to concerns among local people about the project's potentially harmful social and environmental consequences.

Belo Monte fits well into the kind of development model being promoted by IIRSA. As we have seen, there are numerous mining projects already under way in the Amazon basin, and the government is strongly encouraging further expansion, with US\$40 billion of new investment expected by 2015. A key role will be played by *Vale S.A.* (formerly the state-owned *Companhia Vale do Rio Doce - CVRD*), the world's second-largest mining company, which runs the world's largest iron mine at *Carajás*, situated southeast of the *Belo Monte* dam (Hall 1989). Over the next few years it plans to increase output from 90 million to 130 million tons of iron ore – an expansion that will clearly demand a great deal more energy. In April 2011 it announced the acquisition of a nine percent stake in *Norte Energia* (*Bloomberg Business Week*, 28 April 2011). *Vale S.A.* already operates nine hydroelectric power stations in other parts of Brazil to satisfy its huge demand for energy from its mining activities, and it clearly expects to receive large amounts of electricity from *Belo Monte*.

Several Brazilian analysts, particularly those on the left, have highlighted the problems associated with this model of development.¹⁰ First, it is encouraging Brazil to become ever more dependent on exports of raw materials at the expense of manufactured exports. This means continuing an age-old pattern by which Brazil plays a subordinate role in the international division of labour, exporting products that have had very little value added; and it leaves the Brazilian economy

vulnerable to the price oscillations and speculative crises that characterise the commodities sector. While it is true that the decline in Brazilian manufacturing has had multiple causes, including high interest rates and the influx of speculative capital, which have led to the appreciation of the *real*, the relative success of the current model has given the government the leeway to avoid tackling the problems facing the manufacturing sector, which are of great importance to Brazil's long-term development.

Secondly, this model has been imposed from the top down, involving little consultation of local people. As the convoluted history of *Belo Monte* and other Brazilian dams shows, decision-making around hydropower construction in Brazil lacks transparency, to say the least. Fearnside observes, for example, that 'the environmental study and licensing process for the *Belo Monte* dam are viewed merely as bureaucratic rubber stamps to legalise a decision that has already been made.' He and many others are calling for a radical change in the decision-making system to allow a fairer representation of interests and to restrain the ability of construction companies to mould development priorities.¹¹

A third concern centers on the harm to ecosystems and biodiversity caused by this model of development. In his study of the impact of IIRSA, Timothy J. Killeen concludes: 'Deforestation and forest degradation are fully under way along the margins of the Amazon. IIRSA and related initiatives will lead to the further fragmentation of the Amazon, accelerate forest degradation in the Andes, and complete the conversion of the *Cerrado* savannas to cropland' (Killeen 2007). Awareness is growing among scientists over the importance of the Amazon

rainforest in both maintaining the global climate and conserving rainfall patterns in southern Brazil and surrounding countries.

A recent report by the World Bank warned about the severe consequences of disrupting rainfall in the Amazon basin: 'The Amazonian rainforest plays a crucial role in the climate system. It helps to drive atmospheric circulation in the tropics by absorbing energy and recycling about half of the rainfall that falls on it. Furthermore, the region is estimated to contain about 10 percent of the global carbon stored in ecosystems ... Disruptions in the volumes of moisture coming from the Amazon basin could trigger a process of desertification over vast areas of Latin America and even in North America' (de la Torre, Fajnzylber, Nash 2009: 8).

The Brazilian government is confident that it can prevent big projects, including both dams and mines, doing widespread damage to the ecosystem, but many environmentalists are far less confident. The Brazilian government intends to build more than 60 large dams in the Amazon basin over the next 20 years to supply its national electric grid.¹² As yet, the authorities have never managed to prevent a disorderly and environmentally destructive influx of loggers, cattle companies, agribusiness and peasant farmers when it has opened up a region for development and, despite the government's growing efforts to protect large areas of forest by creating reserves and parks, few Brazilian environmentalists are confident that they will be more successful in the future.

Moreover, as noted above and contrary to widespread belief, hydroelectric power stations are not environmentally friendly, particularly in tropical regions. Brazil's National Institute for Space Research (INPE) has calculated that the world's 52,000 large dams emit 104 million metric tonnes of methane annually

from reservoir surfaces, turbines, spillways and rivers downstream (Lima, Ramos, Bambace, Rosa 2007: 193-206). This implies that dam methane emissions are responsible for at least four per cent of the total warming impact of human activities. Fearnside, who has extensively researched dams' greenhouse gas emissions, found that releases from *Curuá-Una* in Pará state were 3.5 times higher than they would have been if a fossil-fuel-burning counterpart had produced the electricity.

If, as suggested earlier, a much larger dam – *Babaquara/Altamira* – is eventually built upstream because of *Belo Monte's* low generating capacity in the dry season, Fearnside believes that the two dams would together produce, during the first ten years of operation, emissions four times higher than an equivalent fossil-fuel plant. After 20 years, the project would still have 2.5 times the emissions of a fossil-fuel plant. Brazilian activists have repeatedly said that it is impossible to raise these issues with BNDES officials, who repeatedly refuse to provide information and to discuss the problems. The BNDES clearly needs to become far more accountable: at the moment, it has a poor record in consulting with local communities, lacks a good policy of access to information and has little transparency.

What becomes clear from the *Belo Monte* fiasco is the close link between political empowerment and true development. It is almost 30 years since the military withdrew from political life yet little has changed for most people living in the Brazilian Amazon (who now total 20 million). Just as when the military decided to construct the Transamazon Highway in the 1970s, far-reaching change is still being imposed on the local people, with little effort made to consult them or

even to explain properly what is happening. A rebalancing of the Brazilian economy away from commodities in favour of manufactures might reduce tension in the Amazon basin but it would not, in itself, improve the lives of the people living there. They might well be abandoned by the state, which in its way might be just as harmful as the current ill-conceived 'development'. What is really needed are long and painstaking efforts both to break the control of the old and often corrupt political elites that still dominate the region and to protect the social, economic and legal rights of the people.

Wider debate over energy

Part of the process of empowerment would involve a fuller public debate, not just in the Amazon region but in the whole of Brazil about the country's energy needs and how they should be met. Currently, Brazil is regarded internationally as a 'clean' energy producer because hydroelectric dams generate over four-fifths of its energy, which is widely perceived as being environmentally friendly. Yet Brazil is in fact the world's seventh largest CO₂ emitter, caused largely by forest burning (Parker and Blodgett 2008). Even though huge amounts of oil have been discovered in the so-called *pre-sal* fields off the coast of Rio de Janeiro, the Brazilian government expects large hydro-projects to continue to play a key role in energy supply, as is clear in the *Plano Decenal de Energia, the ten-year energy plan*, published in May 2010.

Is there an alternative to large and destructive dams in the Amazon, given that the Brazilian economy needs large amounts of relatively cheap and clean energy? Greenpeace thinks there is. In a detailed study, it argues that, in a country

so abundantly endowed with sun, wind and land, renewables can provide abundant energy, while at the time creating thousands of jobs and helping Brazil to win markets abroad (Greenpeace.org 2010). Brazil is already a world leader in ethanol production and it could, Greenpeace argues, develop a similar level of expertise in solar and wind energy. It is not necessary either to exploit the *pre-sal* oil (which would mean that Brazil remains a heavy CO2 emitter, even if it successfully imposes a moratorium on forest felling in the Amazon) or to build further big dams. It is only necessary, Greenpeace maintains, to develop one relatively 'dirty' source of energy – gas – and then only for a transitional period. Its analysis shows that by 2050 Brazil's energy could come from the following sources: hydroelectric power (46%), wind (20%), biomass (17%), solar (9%) and natural gas (7%). Greenpeace's plan foresees the construction of no more big dams but of many smaller and far less damaging mini dams, to serve the energy needs of local communities.

Can Greenpeace win support for its alternative vision? It will be difficult, not least because of the expectations of enormous wealth to be created by the *pre-sal* oil fields. Yet it is possible to change attitudes. Climate change is already creating havoc in Brazil, with freak weather events occurring all the country; some parts of the Amazon basin are getting so hot during the dry season that they are fast becoming uninhabitable. As in many other countries, there is growing public unease at what is happening, although few people have any idea of what can be done. What is needed is public debate in which government officials and environmentalists discuss the issues in an honest and open way.

Conclusion

Will the development model change under Dilma Rousseff? Brazil is keen to present itself as a world leader in international climate-change talks. It is committed in its National Climate Change Plan to an 80 per cent reduction in the rate of deforestation by 2020 in order to meet its voluntary targets on greenhouse gas emissions. Indeed, deforestation rates began falling in 2006 and continued to do so steadily, as a result of both increased environmental controls and falling international demand for commodities such as beef, soya beans and timber as a result of the global economic recession. In May 2011, however, INPE announced that its satellites had detected an accumulated 27 per cent increase in forest clearance between August 2010 and April 2011 (Falcão 2011). In the state of Mato Grosso the rate of forest clearance had actually doubled during the period. Analysts tentatively attributed the rise in forest clearance to the more buoyant rate of economic growth in Brazil and to fears by landowners that controls over forest clearance might become much stricter in future.

It is as yet unclear whether the Rousseff government will act firmly to reduce environmental damage both in the Amazon basin and in the country as a whole. In late May 2011 the Chamber of Deputies approved by a large majority, against the wishes of the executive, a Bill (PL 1876/99) to substantially weaken the country's 1965 forest code. The Bill included, controversially, an amnesty for landowners who had cleared more land than is permitted by law. Although the battle is far from over at the time of writing, the vote does not bode well for environmental policy in Brazil. The agrarian lobby (*bancada ruralista*), an alliance

of right-wing landowners and their allies in Congress, is strong and will attempt to push the bill through the Senate.

President Rousseff could use her presidential veto to prevent some of the more damaging changes in the code becoming law, but such a strategy would erode a great deal of her political capital. In the past, as Minister of Mines and Energy in the first Lula administration, Dilma Rousseff showed little sympathy for the environmentalist cause and was a firm defender of the big development projects being implemented under the PAC. Since becoming president, Rousseff has said little about the environment, biodiversity or climate change. Although an unprecedented environmental disaster could change her views, at the moment there is little to suggest that Rousseff will be other than a fervent advocate of the development model promoted by her predecessor.

NOTES

¹ For a detailed account of the history of Belo Monte and its organizational conflicts, see P. M. Fearnside (2006) Dams in the Amazon: Belo Monte and Brazil's Hydroelectric Development of the Xingu River Basin, *Environmental Management*, 38 (1): 16–27. <http://www.springerlink.com/content/65j70r74581gl231/>

² The dams planned in the 1979 study were Kararaô (later renamed Belo Monte), nearby Babaquara (later known as Altamira), Ipixuna, Kakraimoro, Iriri and Jarina.

³ The Japanese–Brazilian firm Alunorte at nearby Barcarena (Pará) produces 2.4 million tons of alumina annually, and will be complemented by a Chinese–Brazilian alumina plant at the same site producing 10 million tons of alumina. The US company Alcoa will also produce alumina at a new plant to be built at Jurutí. The Japanese–Brazilian aluminum smelter Albrás is also due to expand production as the result of expanded electricity supplies. See Fearnside, op. cit. (2006).

⁴ *Message from Pandora*, released in November 2010.

⁵ See P. M. Fearnside (2002) Greenhouse gas emissions from a hydroelectric reservoir (Brazil's Tucuruí Dam) and the energy implications, *Water, Air and Soil Pollution*, 133 (1–4), 69–96.

⁶ Fearnside (op. cit., 2006) gives the examples of Balbina and Tucuruí, both of which were filled to several metres above the permitted water level without formal agreement, thus expanding the inundated area.

⁷ See Carlos Tautz, Fekipe Siston, João Roberto Lopes Pinto and Luciana Badin, 'BNDES no período Lula: Estado mais ativo, porém não mais autônomo', http://docs.google.com/viewer?a=v&q=cache:GZqWFSVak64J:www.plataformabndes.org.br/index.php/pt/biblioteca/doc_download/46-o-bndes-e-a-reorganizacao-do-capitalismo-brasileiro-um-debate-necessario+BNDES+no+período+Lula:+Estado+mais+ativo

⁸ For instance, in 2009 disbursements from the BNDES were worth US\$68.78bn, compared with US\$11.85bn from the IDB and US\$18.56bn from the World Bank.

⁹ In 2010 the companies' share increased to 82 percent.

¹⁰ See, among others, Tautz, Siston, Lopes Pinto and Badin, op. cit.; Francisco de Oliveira (2006) Lula in the Labyrinth, *New Left Review* 42, November–December 2006.

¹¹ See Fearnside, op. cit. (2006): 9.

¹² Mentioned in various documents such as: P.M. Fearnside (2001) Environmental Impacts of Brazil's Tucuruí Dam: Unlearned Lessons for Hydroelectric

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