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The Price of Light: Privatization, Regulation and Valuation in Brazil

I am confident that private initiative will respond to our call to participate in the financing of our development, and will accept the task of improving and modernizing the country's public services.

President Fernando Henrique Cardoso, September, 1995¹

Elena Landau knew that New York investment bankers were sometimes aggressive and difficult to deal with. But their reaction to her March 1996 presentation at the Plaza hotel suggested a crisis in the making unless something was done to address their concerns.

Landau was the Director of Electricity Privatization at the Brazilian federal development bank, (BNDES). She was visiting New York to generate investor interest in the privatization of Light – Serviços de Eletricidade, S.A. (Light), a large, federally-owned power distribution company in Rio de Janeiro. If successful, the privatization would bring in over \$2 billion to the Brazilian treasury and would reinvigorate the Brazilian privatization program which faced criticism in the domestic and international press for its slow pace and lack of results. But success was far from assured. Members of the financial community suggested that the minimum bid established for the upcoming auction was too high, particularly given the absence of regulation reforms before privatization and the underlying volatility of investments in Brazil.

Ms. Landau attempted to resolve the crisis by renegotiating the terms of sale. The auction would be delayed by a month to the end of May with concessions to investors. Investors were now allowed to bid for 30% of their total bid with “privatization currencies,” Brazilian bond issues which traded at below their face value, effectively lowering the minimum bid of \$2 billion for a 50% plus one share of Light. The government also extended the period of guaranteed rates for customers from five to eight years. Ms. Landau wondered whether these actions were sufficient to generate necessary investor interest – in the past, privatizations had been canceled when no bidders were willing to meet the minimum bid requirements.

Financial and strategic investors quickly incorporated the revised terms into their valuation models to decide whether Light was worth pursuing. Time was short and billions of dollars were at stake.

¹ Cardoso, F., *Public Service Concessions in Brazil* (Documents of the President of the Republic, Brasilia 1995).

Economic Liberalization in Brazil

Central to Landau's presentation was an attempt to convince the audience that Brazil was an attractive location for investment. The fundamentals of the Brazilian economy were clearly encouraging. Brazil had long been seen as the crown jewel of South America. It ranked among the world's largest countries by geographical area (5th), and population (6th). In economic terms, Brazil was one of the world's ten largest economies. Alone, it accounted for two fifths of South America's population and gross domestic product.

Policies that had pulled down the economy in the 1980s were now being changed. From the 1960s through the 1980s Brazil had followed an economic strategy of import substitution supported by high external tariffs and extensive state involvement in the production of goods and services. These policies coincided with significant growth up until the first oil crisis in 1974. But later, Brazil saw the costs of these policies including high levels of corruption, inefficient state-owned enterprises and domestic firms that required increasing protection from imports in order to survive. Reflecting these difficulties, the 1980s became known as the lost decade, as per capita income stagnated, inflation skyrocketed, and foreign debt payments were rescheduled.

The decline in the economy further undermined the tenuous position of Brazil's poor. Brazil had the dubious distinction of having the highest measured level of income inequality reported by the World Bank. Reflecting this inequality, 28% of the populace was classified as living in poverty.² A common sight to visitors was the favelas (or shantytowns) that surrounded Brazil's major cities. In the favelas, life was hard and prospects for escape bleak as poor children grew up with very limited access to education and healthcare.

In 1985, reform began on the political front. Brazil replaced the military government that had ruled Brazil since 1964 with a President appointed by an electoral college. Constitutional reforms in 1988 reduced the President's power by transferring significant power and tax revenues to the 26 state governments and the federal district of Brasilia. The new legislative bodies, with senators and representatives with eight and four year terms, further constrained Presidential authority. Changes in the constitution required super majority of each branch of the legislature, which was very difficult to achieve. Power was peacefully transferred to the first and second directly elected presidents in the 1990 and 1994 elections. It was expected that the election scheduled for October 1998 would proceed peacefully.

Attention then turned to economic policies. An important component of liberalization and stabilization efforts was the ambitious privatization program (PND) introduced by the Collor de Melo government in 1990. Privatization programs under previous administrations had been focused on small firms and raised limited revenues. To dismantle the federal government's long-standing ownership and management of most "strategic" industries, the PND initially identified 34 state-owned companies and minority stakes in 32 other federal companies as sales targets. The federal government attempted to speed implementation by working through executive decrees and other similar mechanisms rather than through direct legislation. Progress was impeded by the restriction of layoffs of state employees, which often required constitutional amendments. By the end of 1995, the government accumulated sales revenue from privatization of R\$9.2 billion ³ (See **Exhibit 1**).

² World Bank, *World Development Report 1997* (Oxford University Press: New York, 1997).

³ To help facilitate sales, some transactions involved so-called privatization currencies such as Brazilian bond issues (including government debt) which were trading in secondary markets at a significant discount. In 1995, one half of privatization payments were made with secured government debt, while cash accounted for just one third of revenues. (Source: BNDES, Report of Activities 1995, Brazilian Privatization Program, Table 5.)

The most visible economic reform was the attack on inflation—a blight that ravaged the Brazilian economy with annual inflation rates exceeding 3,000% a year. In the *Real Plan*, introduced in 1994, the government created a new currency, the *real*, backed by high foreign exchange reserves, and a new government pledge to reduce deficit. Within months of the new currency introduction, inflation stabilized to a manageable 26% by 1995. The increased stability coincided with economic liberalization efforts. These included reduction and equalization of tariff protection mechanisms (average tariff protection across all goods declined from 51% in 1987 to 11% in 1995), deregulation of important industries, and constitutional amendment to render foreign investors a national treatment. In 1996, data revealed some of the benefits of these policies. There was steady growth in exports, inflow of foreign direct investment, increased per-capita income and reduction in income inequality (See Exhibits 2 and 3).

But the investor community still had concerns. Lending support to an impression that politics still revolved around ‘clientelismo’, an exchange of favors, President Collor de Melo was indicted on corruption charges and forced from office in September 1992. Privatization timetables were rarely met. Labor concerns and legal challenges delayed, and in some cases stalled privatizations. Lula de Silva of the Workers party, who was the public face of dissatisfaction with these reforms, suggested that privatization hurt Brazilian workers and enriched foreign businessmen. In the 1989 election, Lula received 46% of the popular vote.

The Brazilian Power Sector

At the heart of the valuation though was an analysis of the prospects for long-term private sector involvement in the power sector. Unlike developed economies, electricity demand in Brazil was expected to grow by a robust 4.4% per year between 1995 and 1999, and by 4.9% per year between 2000 and 2004 requiring an expected \$6 billion in new investment in capacity each year.⁴ Meeting these needs would be difficult under state ownership. As President Cardoso explained in 1995, “with the Federal Treasury carrying, directly and indirectly, debts of more than \$200 billion, it is doubtful that the government will be able to undertake large public investments over the medium term.”⁵

In 1995, the State remained responsible for meeting almost all of the infrastructure needs in the power sector. Eletrobrás, the largest operator in the power sector, accounted for half of generation capacity (97% provided by hydroelectric power), controlled distribution firms and was owned primarily by the federal government. Efforts to deregulate entry in 1993, when the federal government granted auto-generators, cogenerators and independent power producers access to the transmission system, had not led to significant private involvement. Delays in building gas pipelines, the high price of gas sold through the state-owned oil company Petrobras, and the low price of hydroelectric power slowed the entry of gas powered plants (one of the cheapest new forms of electricity supply).⁶

Distribution was also dominated by the state. State governments owned 77% of all distribution assets. The federal government’s two distribution companies—ESCELSA, in the state of Espírito Santo, and the Light Serviços de Eletricidade, S.A.—in the state of Rio de Janeiro accounted for the bulk of the remainder.

⁴ Kirkman and Walder, *Op. cit.* p.2.

⁵ Cardoso, F. *Op. cit.*, p. 10.

⁶ Estimates of the cost of energy from gas powered plants ranged from R\$40-R\$50 per MWh compared to R\$35 per MWh average cost for hydroelectric power (with operating costs alone accounted for R\$5-7 per MWh).

Setting the Stage for the Privatization of Power

To facilitate the introduction of the private sector, as early as 1990, the President's staff debated with Eletrobras officials on how to reform the sector and the sequence in which to sell generation and distribution assets. Finally, a consensus emerged to sell distribution companies first. In April 1991, a government decree listed ESCELSA and Light as state assets to be privatized. This decree signaled the beginning of a long process culminating in the auction scheduled for 1996.

As elsewhere, preparing Light for privatization required a number of prior steps by government. These included specifying the responsible government agency, ensuring legislative changes to allow for privatization, and engaging outside consultants to facilitate the privatization process. In 1991, the responsibility for the preparation and structuring of the sale of federal electricity assets was assigned to BNDES, and a privatization unit was assembled within the bank. Simultaneously, leaders in the Brazilian Congress began to draft legislation for the deregulation of the energy sector that would attract foreign investors to Brazil. In September 1992, the pace of reform was accelerated when BNDES published the prospectus to hire consultants to help with the privatization of ESCELSA and Light and to propose a new model for the Brazilian power sector. After evaluating bids from 13 companies for the two independent appraisals required by law, the government awarded contracts in June 1993 (See **Exhibit 4**).

Political developments slowed down privatization, but only temporarily. Following Collor De Melo's resignation, Vice-President, Itamar Franco, became the new President of Brazil. He appointed a former chairman of a generation company as Minister of the Economy and in a relatively short time, he introduced reforms that addressed several problems that had previously held up the privatization of federally-owned Brazilian power assets.

Legislative Reforms in the Energy Sector

The most important of these problems was the tariff system, which was reformed in several stages. First, authority to set electricity tariffs was transferred from the Ministry of Economy (where it had been the responsibility of the Departamento Nacional de Aguas e Energia Eletrica (DNAEE)) to the Ministry of Energy and Mines. Tariffs had historically been kept low by the Ministry of the Economy so as to reduce inflationary pressures, but their low levels had effectively prevented power companies from operating on a self-sustainable basis. The problem of inadequate tariffs was widely recognized. In the past, the World Bank refused to lend to power projects in Brazil because low tariffs did not allow profitable plant operation. Expectations were that the Ministry of Energy and Mines would be more sympathetic to the sector's needs and set more realistic tariffs.

In April 1993, the government passed legislation to reduce the extensive cross subsidization across regions and customer classes that had been in place since the 1970s. Previously, the DNAEE had defined one national uniform tariff for each category of customer (e.g. residential, commercial, industrial). This tariff theoretically allowed all companies to achieve a rate of return of 10% per annum. But because of differences in cost structures, the system in fact led many companies to achieve far lower rates of return. Prices were now allowed to reflect regional costs. Related legislation, passed in 1995, revised the subsidies for low-income consumers. Based on the assumption that lower income households consume less electricity than more affluent households, DNAEE had overseen a cascade tariff structure (all customers received discounts for the initial energy they consumed). The new legislation, scheduled to be implemented in 1996, eliminated this approach and applied a discount based on total consumption no longer offering discounts for initial energy consumed (See **Exhibit 5** for an illustration of tariff developments for Rio Light).

Law 8631 went further to rationalize the enormous debts within the power sector. Power companies had for years made claims against both state and federal governments that they were owed income they would have earned had their tariff levels allowed them to make a fair rate of return. By 1992, distribution companies claimed that they were owed US\$26,000 million in revenue due to insufficient tariffs.⁷ Because of these debts, most state-owned distribution companies had stopped paying for the energy supplied by federally-owned transmission and generation companies during the 1980s. The end result was an overwhelming “merry-go-round” of debt obligations inside the power sector that foreign investors would clearly be unwilling to assume. Law 8631 eliminated most of these liabilities by issuing ten year Elébtbonds to power companies and the offsetting of debts against unpaid income tax.

Meanwhile, Congress passed two other provisions that would boost investor interest in the Brazilian power sector. One law allowed power utilities to negotiate their own rates with their biggest customers (with the agreement of both parties). Equally important, a constitutional provision intended to limit foreign ownership of Brazilian assets was eliminated in 1995, opening the door to foreign investment in generation.

The First Brazilian Power Privatization - The Sale of ESCELSA

As the legislature slowly passed reform legislation, confidence grew about the future privatization of energy assets in Brazil. Reflecting this confidence, there was a huge increase in the valuation of Brazilian power companies. Throughout the period of state ownership a minority of shares remained held by private individuals, allowing the market to establish a value for companies. Eletrobrás, for example had a market value of US \$2.4 billion as late as February 1993. With these changes, by September 1994, its value rose to US\$25 billion.

In mid-1995, the government privatized Centrais Elétricas do Espírito Santo S.A. (ESCELSA), which was the first power privatization. ESCELSA was a fairly large distribution company with approximately 400,000 customers and yearly sales of US\$306 million. Both Brazilian and foreign investors took interest in the sale. All of the investors shared common concerns. Whereas other Latin American countries, like Chile and Peru, had established regulation before privatization, Brazil reversed the order. Instead of establishing a well-defined regulatory system, the government introduced a concession contract with relatively vague language and left monitoring to an agency that had still not been created. With last minute efforts, the new Brazilian Concession Law was passed only one week before the ESCELSA auction. The law granted foreign investors the ability to undertake activities like electricity distribution. At the time, there was also no consensus on whether and how generation assets would be privatized.

The greatest concern was of course the price. Bidders knew that they had to at least meet the minimum bid established by Elena Landau’s team at BNDES. Two teams of consultants arrived at remarkably close appraisals of R\$578 and \$561 million respectively. Later, the estimate was raised in establishing a minimum set price for a controlling interest of 50% plus one share of \$345 million. Bidders were allowed to bid for 1/3 of the shares using government debt that was, at the time, trading at 50%-70% of face value. The Brazilian investors of the Iven/GTD bidding group won the auction for ESCELSA with a bid 12% over the minimum, offering US\$386 million for a controlling interest (50% plus one share).⁸ José Luiz Alquéres, who had earlier stepped down as president of

⁷ Kirkman and Walder, p. 5.

⁸ For further details on the privatization of ESCELSA and the perspective of investors see Pankaj Ghemawat, “Partnering in Privatization: CIA Bozano, Simonsen” HBS case 9-799-037.

Eletrobrás and became CEO of the Iven group in March 1995, was named the new Chairman of ESELSA.

Little had been done to ESELSA to make it more attractive in advance of privatization. Following privatization, changes were rapid. In the first week of ownership, ESELSA lowered the waiting period for electricity hookup from three months to 24 hours.⁹ By the end of the year they reduced the workforce through voluntary programs by 28% from 2,532 to 1,827 at the cost of approximately \$15 million. The company also increased investment, changed procurement policies and cut energy losses. ESELSA chairman Alquéres also began to lobby the government for a better tariff formula for the power sector at large.

The Privatization of Light

With the sale of ESELSA, pressure grew for the privatization of Light. The Cardoso government wanted to respond to the impression that the PND had stalled, especially compared to the fast pace of privatization elsewhere in Latin America.¹⁰ In the fall of 1995, Planning Minister José Serra publicly promised that Light would be privatized in the spring of 1996.

The Potential Suitors

Several established foreign power companies were interested in Light. HIE of Houston Texas was interested, having established operations in Argentina and interested in expanding in Latin America. AES Corporation (AES) from Arlington Virginia had been active in privatization of generation assets and independent power projects in many countries. The French interest was presented by the giant Electricité de France (EDF), which had been Light's consultant for past ten years and had a very detailed knowledge of Light's system. Without doubt, though, the most likely suitor was Enersis, a Chilean power consortium. As one BNDES official described the Chileans, "they had the strength of investments in Argentina and Peru, they had bid on ESELSA, they knew how to do business in Latin America. And they had good technical people."¹¹ Alongside these strategic investors with operational knowledge were potential financial investors. Brazilian-based investment companies were prominent. These included the purchasers of ESELSA, Iven/GTD. In all likelihood, the winning bid would involve a consortium of these investors.

For example, Steven Shuler of Houston Industries Energy (HIE) was intensely interested in the privatization of Light.¹² HIE's strategy was one of expansion. In anticipation of further domestic deregulation and international privatization, HIE had established a goal of becoming an international diversified provider of energy services. And Shuler had for over a decade been involved in that expansion. In the 1980s, he had led the fuel acquisition group as deregulation took hold in the United States and made gas prices increasingly volatile. Shuler had also participated in HIE's expansion into Latin America. Leveraging his legal training, he helped negotiate natural gas purchase contracts to

⁹ Kirkman and Walder, p. 8.

¹⁰ In response to this criticism, one BNDES official criticized the fast pace of privatization programs in Argentina and Mexico by pointing out that "they made mistakes...critics say that it is slow, but we are a democracy -- there is no Fujimori here. We have to take into consideration lobbies, trade unions, the press, and all this in light of the fact that the average Brazilian is against privatization." Cited in. Kirkman and Walder, *Op.cit.*

¹¹ Kirkman and Walder, *Op. cit.*

¹² HIE was the eighth largest US distributor of power focusing its activities in the area in and around Houston

supply HIE's newly purchased Argentinean facilities, which had been privatized in 1993 and 1995. The company was successful in improving the operations of the acquired companies. For example, HIE reduced non-technical line losses from 20% when they purchased the firm to just 4.6%, one of the lowest levels in Argentina.

In 1995, following a company-initiated global survey of areas holding potential for HIE, Brazil was identified as one of four or five most attractive countries for investment. Shuler had visited Brazil in January of 1996 and on March 11th he established HIE's office in Brazil, the first office HIE had introduced in a country where it did not have an established project. He had simple directions – "go down there and see what you can find."

In addition to these strategic investors were financial advisors. They had to make recommendations to their clients, who were financial investors, whether they should buy up some of the shares that were publicly traded in advance of privatization. Since the clients would take a passive rather than a controlling stake in Light, they were concerned with the limited ability of minority investors to protect their interests. As observed in **Exhibit 6**, Brazil ranked very low on legal protections for minority investors, expected enforcement of law and accounting standards in local companies. This made the financial advisors' decision challenging, as they thought of ways to mitigate the lack of necessary corporate governance structures.

All of these potential investors were well aware of the opportunity and risk of investments in Brazil. The stock market had averaged equity returns from 1991 to 1996 of 44 % per year.¹³ Equity volatility was similarly high at 55%, 6th highest in the same sample. Reflecting the underlying sovereign risk, the spread between U.S. Treasury bills and stripped Brazilian Brady bonds (also denominated in U.S. dollars) ranged from 9.5% to 16.5% between March 1995 and March 1996¹⁴ (See **Exhibit 8**). These risks had to be factored into any analysis.

The Prize – Light

Light – Serviços de Eletricidade, S.A. was founded by Canadian investors in 1899. Initially providing other public services including transportation, gas and telephone service, the company concentrated its activities on power in Sao Paulo and Rio and sold off other concessions to the government. In 1978, completing a wave of federal takeovers of private power companies begun in 1964, Eletrobrás purchased Light from its Canadian owners. Like Eletrobras, Light continued to have some publicly traded shares, although these only amounted to 18% of the company shares.

To prepare for privatization the Rio distribution company was separated from the Sao Paulo company and the Rio company retained the name Light. Light was a larger and stronger company than ESCELSA (See **Exhibits 5 and 7** for relevant data on Light and **Exhibit 9** for comparable data). More than half of Light's sales came from residential and commercial customers. Light provided 77% of the power in the state of Rio de Janeiro, and had 2.7 million customers from a total population of

¹³ This average was the highest return from a sample of 39 developed and developing countries (sample mean of 13%). See Stephen Godfrey and Ramon Espinosa, "A Practical Approach to Calculating Costs of Equity for Investments in Emerging Markets," *Journal of Applied Corporate Finance*, February 4, 1997.

¹⁴ In a brady bond debt rescheduling, the issuing government is required to hold US treasury bills as partial collateral for the bond issue. The stripped version adjusts the yield to take into account the collateral. For further information on using stripped brady bonds and for country comparisons see Stephen Godfrey and Ramon Espinosa, "A Practical Approach to Calculating Costs of Equity for Investments in Emerging Markets," *Journal of Applied Corporate Finance*, February 4, 1997.

11 million.¹⁵ Light also owned generation facilities that provided about 17% of its energy supply.¹⁶ Light purchased the rest of its power needs from two state-owned generators, Furnas and Itaipú, the mammoth Brazilian-Paraguayan hydroelectric dam in southern Brazil.

The new owner was expected to address weaknesses in management, labor, line losses and procurement. In the past, management was based on political affiliation rather than expertise and merit. Non-technical losses from theft, non-payment by the government, non-metering and administrative issues were suspected to account for two thirds of all losses for Light (in particular, non-payment by favelas, other residential consumers and public authorities) and government consultants suggested the possibility of reducing these non-technical losses by half. Other possible areas of improvement included contracts with suppliers to Light. Under Brazilian law 8.666, all government entities had been required to use competitive bidding procedures for contracts with suppliers. In many instances, cartels of service companies had formed, rigging bids for their services, and raising prices for the public sector. As a privately owned company, Light would not have to abide by these guidelines. Such cost savings could amount to 25%.

Areas of uncertainty included the value of generation assets and required future investments. While the government had announced plans to privatize generation, there was little information on timing and process. The government provided estimates of future investment needs but acknowledged the great uncertainty. There was no reliable information it could provide to investors on the quality of lines, transformers, and sub-stations.

Privatization Before Regulation

Like ESCELSA, Light's privatization was planned before the government had created a regulatory body with well-defined procedures for its future operation. In contrast, in Chile, Peru and Argentina, the government first published detailed rules regarding tariffs structure, set limits on gains or losses to investments, and identified a philosophy to guide new regulatory agencies.¹⁷ For Light, the rules and procedures were instead defined in the concession contract that new owners were required to sign as part of the privatization.

The concession contract had some attractive features to new investors. It specified a concession term of thirty years. It eliminated DNAEE's role in management decision making. In the past, DNAEE was involved in guiding the day-to-day operational management of companies in the power sector. Many decisions were based not on improving operations or on making efficiency gains, but on alleviating political situations or repaying political favors.

Rather than specifying management's role, the contract identified some service obligations and rules for setting tariffs. Specifically, Lights' new owners had an obligation *"to adopt state of the art adequate technology and use equipment, installation and operating methods that ensure services of the highest quality, continuity and reliability level."* (2nd clause, 1st sub clause). Regarding outages, the concessionaire was required to *"maintain and improve the electricity continuity level, taking as a reference the average recorded... over the last five years."* (2nd clause, sub-clause 15) The regulatory agency was

¹⁵ Electricity consumption is usually measured in kilowatt-hours, which is the amount one kilowatt (1,000 watts) of capacity produces in one hour. Capacity is usually measured in megawatts (1,000,000 watts = 1,000 kw). One megawatt of capacity can produce 8,760 megawatts or 8.76 million kwh of power in a year (365 days x 24 hours). National consumption is often measured in terawatt hours. A terawatt is equal to a trillion watts = 1,000 megawatts = 1,000,000 kilowatts.

¹⁶ At the time, investors suggested that the replacement cost of capacity varied from US\$ 500,000 for gas to US\$750,000/ MW for thermal to \$1,200,000/ MW for hydro capacity.

¹⁷ In Chile for example, the government guaranteed at least a 6% return on assets and a maximum of a 16% return on assets.

given the right to impose fines if the concessionaire did not abide by his obligations.¹⁸ Suggesting continual social obligations, Light was required to enable energy conservation by customers.¹⁹

The rules on tariff setting were perhaps the most important element of the concession contract. Under the contract, the government would establish a new level for rates and a formula for adjusting them every five years. Each year over the first five years, tariffs could be adjusted on an annual basis for two reasons. First, costs associated with purchased power and taxes (aside from income tax) would be passed through directly to consumers through tariff increases. Second, costs arising from inflation would be passed through to customers. In essence, this was a version of RPI-X regulation, where X was set to zero for the first five years. If Light's costs (aside from purchased power) rose by less than inflation, it would keep the surplus, if they rose by more than inflation, it would bear the margin squeeze.

After the initial five years, the concession contract used vague but expansive language regarding tariffs. The regulatory agency would be given the discretion to increase or decrease tariffs, "*taking into consideration the changes in the concessionaires' costs and market, the tariff levels charged by similar companies within Brazilian and international contexts; efficiency fostering measures and the reasonableness of tariffs.*" (Clause 7 sub-clause 2)

To monitor the obligations under the concession contract, the contract referred to an autonomous technical agency under the Ministry of Mines and Energy. At the time of the auction, this agency had not yet been established. The agency was given significant rights to data including access to contracts entered into by Light. Disputes would ultimately be resolved by the Federal Court in Brasilia.

The concession contract was also silent about plans for privatizing generation assets. At the time, the government was continuing to contemplate privatization of generation elsewhere in Brazil and had hired international consultants to speed the process. Consultants were recommending a variant of the pool pricing system then in use by the United Kingdom.

While unusual to foreign investors, some Brazilians saw this policy of introducing a relatively vague regulatory institution to be defined over time as fitting with Brazilian culture.

We Brazilians believe that these regulations will come out sooner or later. If you want to invest in Brazil, you have, to some extent, to make a leap of faith. You can't wait for all the rules to be made – you'll be dead by that time! Most of the time things in Brazil are in a gray zone. But that doesn't mean things are not transparent.²⁰

Putting a Minimum Price on Light

Elena Landau's privatization team within BNDES used what was called a "plain vanilla, discounted cash flow analysis"²¹ using Light's accounting and financial statements for the year ending June 30, 1995 (balance sheets, statement of income and operational cash flow), projecting cash

¹⁸ Where the actual average outage level was higher than the limit specified in advance, the concessionaire was required to submit a program to improve the situation over the next three years.

¹⁹ If Light failed to introduce an acceptable program, the regulatory agency could introduce one that cost a maximum of 1% of revenues.

²⁰ Renaldo Veirano, Partner, Veirano e ADVS. Ass. Quoted in Marshall Kaplan, "Energy Restructuring in Brazil," *The Journal of Project Finance*, Summer 1997.

²¹ Kirkman and Walder, *Op. cit.* p. 10.

flows for the next ten years and discounting these using a real discount rate of 10.69%. Following this initial ten-year period, the consultants assumed a perpetuity of the last period's cash flow. The appendix provides a modified version of the financials and assumptions used in preparing the government's valuation. The government also included provisions for non-operational expenses, which they projected to amount to \$418 million including \$42 million for labor contingencies and \$268 million adjustment arising from special auditing.

One BNDES official described their approach:

We don't want to go for the minimum, but we try to cut it as close as possible. In the government we tend to be more conservative in our estimations of how many layoffs will be possible because of the threat of strikes, and the other efficiency changes that can be made. While we are more conservative on the opportunity, we are more optimistic on risk than investors – in the case of Light, that is clear when we only used a 10.69% discount rate.²²

The price for shares sold at auction was set in spring of 1996 at \$390.23 per 1000 shares based in part on this valuation, but also reflecting political factors.²³ Thus, the cost to achieve a controlling interest (50% plus one share) would be \$2.03 billion. The government asked for all payments in Brazilian currency, not privatization currencies.

Renegotiation Before Auction

As soon as this minimum bid was announced, investors began to complain. The \$390.23 share price implied by the minimum bid was clearly above the market price of shares that ranged from \$247 to \$358 since November, and was trading at \$301 at the beginning of March. The IVEN group and the Chileans in particular suggested a need to revise the auction to lower the price and to increase potential revenues. When Elena Landau went on her road show, the international financial community echoed these concerns. As analysts at Banco Bozono Simonsen declared, "If the auction does not take place on 18 April 1996, not only will the stock fall, but so will our valuation of the company, as cost-cutting gains from privatization will be postponed."²⁴

Planning Minister José Serra accepted changes in the structure of the privatization. As he still wanted a rapid privatization, the bid price was not changed since that required additional political approvals. However, BNDES now specified that bidders could bid with privatization currencies for 30% of the total bid. This amounted to a discount, as privatization currencies were then trading at 50%-70% of face value. To reduce uncertainty, the tariff formula was extended from 5 to 8 years, less than the 10 years demanded by potential investors. Additionally, the investment arm of BNDES made it known that it would provide stop-gap financing to the winning suitors. The auction was now scheduled for May 21, 1996.

²² Kirkman and Walder, *Op. cit.*, p.10.

²³ Employees of privatized companies in Brazil were consistently given a chance to participate in the sale at a discount. Light employees were guaranteed one seat on the Board once the company was privatized.

²⁴ Banco Bozano Simonsen, "Brazil Company Report, 29th February, 1998.

The Decision

Some thought the government's decision to reopen the terms of the auction was unnecessarily generous to investors but was it enough to encourage a successful sale?

Two questions dominated the concerns of strategic investors such as Steve Shuler of HIE. First, did the deal made financial sense using conventional analyses of electric utilities. Second, did investors need also to take into account the weak set of institutions to protect the rights of shareholders in Brazil.

Investors examined the analysis provided by the government and additional company information (See **Exhibit 9**). Projected cost savings from government consultants seemed conservative. Strategic investors also factored in other issues. The future privatizations planned for Brazil, with CERJ to be privatized in 1997 and Eletrobras in the next year, meant that a stake in Light might be just the start of a larger investment in Brazil and Latin America. There was also the question of regulatory uncertainty.

The sheer size of Rio Light made it likely that most investors would want to reduce their financial exposure in this transaction by combining with other investors. The advantage of this approach was that competition would likely revolve around who could put together a consortium, rather than around active competition in the auction process. HIE knew by now that if it won the bid it would be part of a consortium with EDF, the large French company that had acted as a consultant to Rio Light over the past ten years, a Brazilian company, and possibly another partner, each with equal stakes. The winner would not have absolute control of the company.

Pure financial investors made different calculations, worrying less about future growth and more about the implications of being a minority shareholder in a company in country with very weak protections. If they couldn't sell their shares to one of the new investors, would it retain its value over time?

Investors examined the revised terms once again and decided whether to make a bid.

Exhibit 1 Privatization in Brazil, 1991 - 1995

Sector of Privatized Company	Date	Number of Companies	Nominal Sales Revenue (\$US million) ^a	Revenue from Foreign Sources (% of total)
Completed				
Steel	1991-1994	8	\$5,561	4%
Petrochemical	1992-1995	22	2,486	5
Fertilizers	1992-1994	5	418	1
Electricity	1995	1	400	0
Others	1991-1994	5	350	20
Total		41	\$9,215	30%
Planned				
Electricity	1996	1		
Railways	1996	5		
Mining	1997	1		
Electricity	1997			

Source: Extracts from BNDES and PND, Report of Activities 1995, Brazilian Privatization Program, (Brasilia, 1996)

^aFor many transactions, particularly in the early stages of the program, a significant fraction of sales were conducted using so-called privatization currencies.

Exhibit 2 Macroeconomic Data for Brazil

	1981	1991	1992	1993	1994	1995
GDP (US\$ billion)	NA	404.5	377.5	438.4	564.6	717.2
Population (million)	124.1	147.1	149.4	151.6	153.7	155.8
GDP/head (1995 US\$ prices)	NA	3,359.0	3,280.0	3,368.0	3,512.0	3,609.0
Consumer price changes (%)	105.6	440.9	1,008.7	2,148.4	2,668.5	84.4
Bank interest rate (% p.a.)	121.0	2,494.3	1,489.0	5,756.8	56.4	39.0
Real effective exchange rate (%) ^a	135.0 ^a	118.5	127.7	115.4	91.0	NA
Total external debt (US\$ bn)	61.4	122.5	128.7	143.8	151.6	159.1
Total external debt/GNP (%)	NA	32.2	34.9	33.9	27.8	24.0
Total reserves minus gold (\$ bn)	6.6	8.0	22.5	30.6	37.1	49.7
Industrial wage in Sao Paulo, Brazil (% real change)	NA	(4.7)	16.0	11.4	8.9	8.7
Share of income/ consumption(%)		1989 Survey				1995 Survey
Lowest 10%	NA	0.7	NA	NA	NA	0.8
Second 20%	NA	4.9	NA	NA	NA	5.7
Highest 10%	NA	51.3	NA	NA	NA	51.3

Source: IMF International Financial Statistics Yearbook, EIU World Outlook & Brazil Country Profile, UCLA Statistical Abstract of Latin America, World Bank World Development Indicators; Datastream.

^aReal effective exchange rate for exports (1990=100), measured as the average of the indexes of the mail official real exchange rates between Brazil's currency and the currencies of its main trading partners, weighted by the share of that country's total exports represented by exports to each of the trading partners. As 1981 is data not available, coverage for 1982-1985 is given.

Exhibit 3 Balance of Payments (US\$ million)

	1991	1992	1993	1994	1995
Merchandise exports ^a	31,619	35,793	39,630	44,102	46,506
Merchandise imports	(21,041)	(20,554)	(25,301)	(33,241)	(49,663)
Trade balance	10,578	15,239	14,329	10,861	(3,157)
Service balance	(3,891)	(3,342)	(5,590)	(5,346)	(7,495)
IPD inflows and outflows ^b	(9,651)	(7,997)	(10,322)	(9,901)	(11,105)
Current-account balance	(1,450)	6,089	20	(1,153)	(18,136)
Direct investment	(42)	1,443	801	2,035	3,475
Portfolio investment	3,808	7,366	12,322	44,732	9,235
Other capital	(7,895)	(2,293)	(5,438)	(38,629)	16,952
Capital-account balance	(4,129)	6,516	7,685	8,138	29,662
Overall balance	(4,685)	11,266	6,890	6,543	12,973
Exceptional financing	5,621	4,430	2,323	750	0
Change in reserves (increase)	369	(14,670)	(8,709)	(7,215)	(12,920)

Source: Adapted from IMF International Financial Statistics Yearbook.

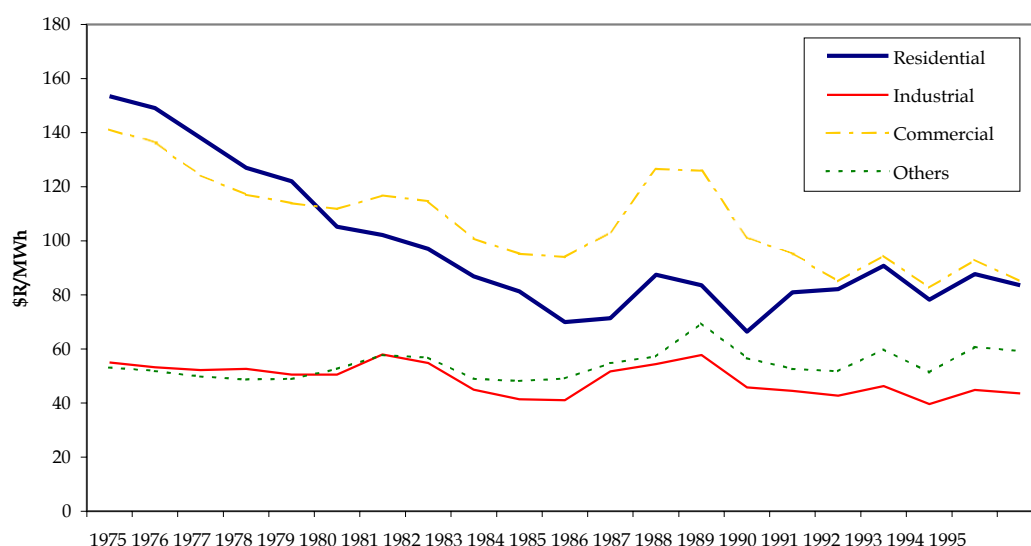
^aFOB (Value at freight on board)^bInterest, Profits & Dividends**Exhibit 4** Preparing Light for Privatization

Activity	Date Relative to Announcement of Intent to Privatize						
	1991	1993	1996				
	April	June	Dec.	Feb.	March	April	Oct.
Decide on privatization	■						
Select first financial advisor		■					
Select advisor for privatization			■				
Select auditors			■	■			
Valuation exercise			■	■	■		
Draft prospectus			■	■	■		
Issue prospectus and concession				■	■	■	
Contract				■	■	■	
Technical meeting on concession				■	■	■	
Visits to Light				■	■	■	
Pre-identification for the auction				■	■	■	
Qualification of pre-identified bidders				■	■	■	
Auction					■	■	
External auditors review and report		■	■	■	■	■	■
Preparing supporting legislation	■	■	■	■	■	■	■

Source: Author's synthesis based on introduction manual, Privatization of Light, SENN, CLC, 1996.

Exhibit 4 (continued) Procedure for Preparing a Minimum Bid

Legislation in Brazil required the use of a minimum bid. Two consultants, hired through competitive bidding, were responsible for performing independent economic and financial appraisals of the company. In addition, the second consultant was responsible for preparing a report that included a valuation of assets, a legal evaluation, special auditing, an evaluation of human resources, an assessment of social impact, and an actuarial evaluation. Officials in BNDES, the Ministry of Planning, and the Ministry of Mines, would debate the models and assumptions that the consultants used in arriving at their official valuation.

Exhibit 5A Light Average Annual Tariffs at Constant Prices \$R/MWh

Source: Adapted from "The Privatization of Light – Servicos de Eletricidade, SA: Preparing the Terms of Sale," Kennedy School of Government #1540.

Exhibit 5B Previous vs. Proposed Residential Tariff Structure (December 31, 1995)

Previous Residential Tariff Structure			New Residential Tariff Structure		
Level of Consumption	Tariff (\$R/MWh)	Discount (%)	Level of Consumption	Tariff (\$R/MWh)	Discount (%)
0 x 30 kWh	\$21.48	81%	0 x 30 kWh	\$39.76	65%
31 x 100 kWh	51.18	55	31 x 100 kWh	68.17	40
101 x 200 kWh	86.85	24	101 x 200 kWh	102.25	10
> 200 kWh	113.61	0	> 200 kWh	113.61	0
			Rural	64.20	43
			Public Lighting	53-86	0

Source: Adapted from BNDES, Publication No. PND/-08/95—Light.

Exhibit 6 Protections for Minority Investors (1996)

	Brazil	Argentina	Chile	USA
Legal protections for minority shareholders (scale 1-6)	3.00	4.00	5.00	5.00
Expected enforcement of law (scale 1-10)	6.32	5.35	7.02	10.00
Accounting standards in firms (scale 0-90)	54.00	45.00	52.00	71.00

Source: Adapted from Rafael La Porta, "Law and Finance," *Journal of Political Economy*, December 1998.

Note: The ranking within the scale increases with more protections for minority shareholders, higher expectations for enforcement of law and stricter accounting standards.

Exhibit 7 Operational Data for Rio Light

	1991	1992	1993	1994	1995
Energy supplied (GWh)	21,964	22,191	22,783	23,674	25,185
Energy sold (GWh)	19,141	19,282	19,486	19,896	21,170
Total losses (GWh)	2,823	2,909	3,297	3,778	4,015
# customers ('000)	2,598	2,617	2,658	2,689	2,702
# of employees	12,077	11,975	11,800	11,702	10,618
# hours without service/ year*	21	15	21	16	0
# interruptions/ year*	15	15	19	16	0
Investment (millions of reals)	139	175	150	136	216
Depreciation(millions of reals)	130	150	172	181	188
Ratios					
Losses as % of supply	13	14	14	16	16
Customers/ employee	215	219	225	230	254
Energy sold/ employee (MWh)	1.58	1.61	1.65	1.70	1.99
Human Resources	Number of Employees June 30, 1995			%	
Administrative		1,969		17.2%	
Operational		6,163		54.0	
Professional		1,126		9.9	
Technicians		1,674		14.7	
Heads of Department		486		4.2	
Total		11,418		100.0%	
Installed Capacity					
Generating Plant	First Built		(MW)	Power Source	
Fontes Nova	1940		132	hydro	
Nilo Pecanha	1953		380	hydro	
Pereira Passos	1962		100	hydro	
Ilha de Pombes	1924		164	hydro	
Total			776		
Transmission Lines	km	Distribution Network		km	
Overhead Lines	2,036	Lines (km '000)		163	
230 kV	126	Poles (# '000)		523	
138 kV	1,910	Transmission/Dist. substations (MVA)		6,500	
Underground 138 kV	149	Transformers (MVA)		5,154	

Source: Adapted from BNDES, Publication No. PND/-08/95, Servicos Visando a Desestatizacao de Light, Sumario Executivo, June, 1995.

Note: Grande Rio is one of regions in Light service area. It accounts for 1.7 million customers. All power in this region is provided through aerial transmission and distribution.

Exhibit 8 Alternative Approaches to Discount Rate Setting

	A typical WACC approach for U.S. electric companies ^a	"Incorporating country risk..." modified to distribution companies in Brazil ^b
Cost of Equity		
US\$ risk free rate (30 yr Treasury)	6%	6%
Sovereign risk premium (spread between stripped Brady bond and U.S. treasury)	0%	10% ^d
U.S. equity risk premium (estimates range from 4-8%)	7%	7%
Offshore project beta = country beta* (beta of comparable home country project ^c)	$0.34=1*0.34^a$	$0.823=2.42*0.34^a$
Country Beta = relative volatility * correlation b/n domestic and U.S. market	1	2.42
- relative volatility	1	6.04
- correlation b/n domestic and U.S. market	1	0.40
Nominal cost of equity	8.4%	21.8%
Cost of Debt		
Typical debt as % of debt + equity in U.S. electric companies (Jan. 1996)	30%	
Pre-tax cost of debt (average public utility bonds, Jan. 1996)	7.2%	
After-tax cost of debt	4.8%	
Nominal weighted average cost of capital (WACC)	7.3%	16.7%
Real weighted average cost of capital (WACC) (assuming expected inflation rate of 3%)	4.6%	14.0%

Source: Created by casewriter.

^a Data for U.S. electric utilities from Compustat.

^b Donald Lessard, "Incorporating Country Risk in the Valuation of Offshore Projects," *Journal of Applied Corporate Finance*, Fall 1996.

^c This approach is valid "under the simplifying assumption that the risk of the project bears the same relation to the risks of the local economy as a comparable project in the home country." Lessard, p. 60.

^d Yield as of March 1996. The Brady striped yield spread had a high of 16.5% and a low of 9.5% over the previous twelve months. S. Godfrey and R. Espinosa, "A Practical Approach..."

Exhibit 9 Comparable Distribution Companies

Accounting and Marketing Data	Net Profit 1995	Net Revenues 1995	Book Value Dec. 31, 1994	Market Value March 1996
(US\$ million)				
Privatized				
ESCELSA	-103	306	848	874
Plans for Privatization				
CERJ	NA	382	176	468
LIGHT	98	1,506	2,933	3,144
CPFL	-53	1,152	2,265	1,059
No Plans for Privatization				
CELESC	-83	542	1,307	294
Privatized (not in Brazil)				
Chilectra (Chile 1997)	181	1,132	NA	1,995
Edelnor (Peru 1997)	52	298	NA	419

Physical Data	GWh Sold 1996	Customers (million) 1996	Generation Capacity (MW)	Employees 1995	% Energy Loss 1996	GWh/ Employee	Cust./ Employee
Privatized							
ESCELSA	2,798	0.4	170	1,827	9	1.5	218.9
Plans for Privatization							
CERJ	6,157	1.2	66	2,898	27	2.1	414.2
LIGHT	21,689	2.8	776	10,618	16	2.0	263.7
CPFL	16,704	2.3	129	NA	6	NA	NA
No Plans for Privatization							
CELESC	9,495	1.4	74	5,037	9	1.9	277.9
Privatized (not in Brazil)							
Chilectra	13,907	2.4	0	1,673	8	8.3	1,434.5
Edelnor	3,257	0.8	0	777	12	4.2	1,029.6

Ratios	P/E 1995	Price/Book	MV/Rev	MV/Customer	MV/GWh (\$1,000)
Privatized					
ESCELSA	Loss	1.03	2.9	2,185.0	312.4
Plans for Privatization					
CERJ	NA	2.66	1.2	390.0	76.0
LIGHT	34	1.07	2.	1,122.9	145.0
CPFL	Loss	0.47	0.9	460.4	63.4
No Plans for Privatization					
CELESC	Loss	0.22	0.5	210.0	31.0
Privatized (not in Brazil)					
Chilectra	11	NA	1.8	831.3	143.5
Edelnor	8	NA	1.4	523.8	128.6
Midlands Electricity (UK 1996)			1.1		
E. Midlands Electricity (UK 1996)			0.8		

Source: Authors estimates using data from Morgan Stanley Dean Witter and Bozano Simonsen.

Appendix

Assumption Sheet for Modified BNDES Valuation

- A discount rate of 10.69%.
- An annual average growth rate in demand for residential and non-residential users of 4.4%. Assume all expenses except cost of purchased power grow at this rate.
- An increase in tariffs of 15.6% in the first year and no changes after that in real terms. This is the net impact of an 8% increase for non-residential users and a 20% increase for residential users. This tariff adjustment accounts for the elimination of the cascade system of discounts for all classes of residential customers.
- An increase in the costs of purchased power of 7.45% in the first year. All future changes in costs of purchased power will be passed through in tariff increases.
- A 15% reduction in employment in the first year and a further 15% reduction in the second year. Provisions of \$42 million for labor charges included in total provisions of 418 million. (details on p.10).
- The Value Added Tax and other related deductions would continue to constitute approximately 24% of operating revenues (before operating expenses and taxes)
- Light would be responsible for taxes at 33% of net operating income. This includes a reduction in tax rates in December 1995 so that annual income taxes of 25% (including supplemental tax) and social contribution rate of 8%.
- Working capital is a constant percentage of sales.
- Projected Investments in Light

R\$ million	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Generation	24.2	19.2	14.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Transmission	50.9	51.6	7.7	7.7	40.9	79.7	84.2	89.1	93.0	93.4
Distribution	42.5	42.9	46.4	48.2	58.0	60.1	62.3	64.4	66.5	67.2
Other	<u>26.4</u>	<u>21.4</u>	<u>15.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>
Total	144.0	135.1	83.3	68.1	111.1	152.0	158.7	165.7	171.7	172.8

Source: Casewriter estimates.

Note: The exchange between the Brazilian real and the U.S. dollar at the time was approximately 1 real = 1 U.S. dollar.

Light-Servicos de Eletricidade, SA
Modified Statements of Operations
Adjusted for Spin-off between Light and LightPar

Millions of Brazilian Reals	1995
Operating Revenues	
Sale of Electric Power	1,987
Other Revenue	<u>22</u>
Gross Operating Revenues	2,009
Deductions	
Value-added Tax on revenues – ICMS	326
Other Taxes—PIS/COFINS	47
Fuel Oil Quotas, Quota for reserves	<u>98</u>
Total deductions	<u>471</u>
NET OPERATING REVENUES	1,538
Operating Expenses	
Employees	293
Materials	25
Contracted Services	85
Electric Power Purchased for Resale	673
Depreciation and Amortization	203
Other	<u>95</u>
Total Operating Expenses	<u>1,374</u>
NET OPERATING INCOME	164
Financial Income (Expenses)	
Interest Income	56
Interest Expense	<u>(32)</u>
Financial Income (expense), net	24
Non-operating income	<u>(14)</u>
NET INCOME before income taxes and social contribution	174
Income tax and social contribution	<u>57</u>
NET INCOME after income taxes and social contribution	<u>117</u>

Source: Notes to Annual Report, section 17.

Note: Some of the financial information included in this table has been modified from actual data for the purposes of class discussion.

Light-Servicos de Eletricidade, SA

Balance Sheet as of June 30, 1995

Millions of Brazilian Reals	June 30, 1995
ASSETS	
Current Assets	
Cash	38
Receivables	163
Tax compensation and other credits	<u>211</u>
Total Current Assets	412
Long Term Assets	
Repassed loans and financing	319
Others	<u>69</u>
Total Long Term Assets	388
Permanent Assets	
Investments	27
Other	329
Property, Plant and Equipment	<u>2,670</u>
Total Permanent Assets	<u>3,026</u>
TOTAL ASSETS	<u>3,825</u>
LIABILITIES AND SHAREHOLDERS' EQUITY	
Current Liabilities	
Suppliers	78
Taxes and contributions	122
Other obligations	<u>113</u>
Total Current Liabilities	313
Long Term Liabilities	
Loans and Financing	532
Special Obligations	222
Others	<u>447</u>
Total Long Term Liabilities	1,202
Shareholders' Equity	<u>2,311</u>
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	<u>3,825</u>

Source: Notes to Annual Report, section 17.

Note: This proforma financial statement prepared as if the spin off had occurred on January 1, 1995. Investments linked to Electropaulo and Eletrobras have been removed.