Driving Forces of the Brazilian Electricity Industry Reform

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This paper addresses the main driving forces of the Brazilian Electricity Industry Reform. The paper shows that although we can identify important motivations to increase the industry's efficiency, more general macro-economic motivations are playing an essential role in the industry's reform process. The paper argues that the recent macro-economic reforms in Brazil, aiming at the stabilisation of the economy, represent the main driving force for introduction of market oriented reforms and the privatisation of the electricity industry. Given this scope, the government has emphasised the privatisation process to the detriment of a new regulatory framework capable to guarantee an efficient allocation of resources in the industry. The article points and analyses the main unsolved questions for the creation for the new market oriented regulatory framework.

Keywords : Electricity Industry Reforms ; Regulation Framework; Brazil.

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Introduction

In the 1980s, the traditional form of organization of the electricity industry has been questioned both in developed and developing countries. This questioning was due to the end of the "virtuous circle" in which the expansion of the electricity industry was accompanied by decreasing tariffs and amelioration of service quality, as a result of exploitation of scale economies in distribution and generation of electricity. The reduction of costs and the expansion of demand were auto-reinforcing elements in the virtuous circle. In several developed and developing countries, the public ownership aided this virtuous circle by providing a relatively low-cost source of financing for the industry, enabling the utilities to expand and to improve their services more rapidly.

The maturity of electricity industry in the industrialized countries contributed to exhaust the technical opportunities of costs reduction by exploiting scale economies. In addition, the oil crisis in the 1970s caused the reversion of the trend of decreasing tariffs. The raising tariffs and the perception that the traditional institutional framework was no longer capable of inducing utilities to a more efficient pattern of resources' allocation, have engendered a political movement pro-reform of the electricity industry organization in the majority of industrialized countries (Oliveira, 1997 and Chevalier and Salaun, 1995).

This movement has also influenced Latin American countries. These countries have also experienced important deterioration in the performance of the traditional pattern of development of the electricity industry. However, the crisis in Latin American electricity industry arises from a different context as compared to developed countries. In most countries in the region, including Brazil, the electricity industry is not yet mature. Electricity demand is expected to continue to grow at a high path in the next two decades. In addition, important hydroelectric resources remain still unexplored. The crisis in the Latin American electricity industry is essentially linked to the sector's financial organization (Pinto Junior, 1993). The debt crisis in the beginning of the 1980s finished with a long period of industry expansion based on relatively low cost international capital.

After the debt crisis, only multilateral institutions (read the World Bank) continued to finance Latin American electricity industry at the international level. This financial context gave this institution important political power to enforce structural reforms in the regulatory framework of the Latin American electricity industry. The World Bank has identified several points at the origin of the deterioration of the electricity industry performance such as the political intervention in the management of the public utilities (nepotism) ; inappropriate energy policy and tariff structure (mainly, subsidies and political control of tariffs) ; lack of control of utilities' efficiency ; and the use of public utilities as an instrument to obtain foreign currency ; to mention only the most relevant ones (Pinto Junior, 1997). These diagnoses have oriented the World Bank's propositions for the electricity industry reforms. These propositions emphasize the creation of new regulatory agencies, independent from both the government and the utilities; the establishment of new tariff structure, ending subsidies and considering the long term marginal cost ; the priority to investments in the reduction of technical and commercial losses; and especially the increasing participation of the private sector in the industry. This approach is emphasized in the recent electricity industry's reforms in several Latin American countries (Oliveira and Pinto Junior, 1996).

In Brazil, fundamental reforms are being introduced in the regulation framework of the electricity industry. Although we can identify some motivations to orient the reform of Brazilian Electricity Industry (BEI) in accordance to the World Bank approach, more general macroeconomic motivations are playing an essential role in this reform. Traditionally, there was no controversy among relevant Brazilian political and economic agents concerning the strategic public task of the electricity industry for the industrialization process. This approach has justified the dominance of the public sector in the development of the electricity in industry in Brazil (Martin, 1966 and Alveal, 1993). However, a new vision regarding the role of the State in the economy and the recent program for macroeconomic stabilization have been predominant sources of motivation for the process of reform.

The influence of the macroeconomic motivation in the reforms of BEI gives rise to the question of the synchronism between this motivation and those associated to industry's efficiency. Although the reforms are not concluded, we have already enough empirical elements to perform a preliminary analysis of the influence and probable effects of the macro-economic motivations upon the future configuration of the electricity industry. This paper claims that, up to this moment, macroeconomic policy has prevailed as the main motivation driving the reform process. The reform process has emphasized the privatization of BEI, within a context of unclear regulation framework. This approach presents some risks for the efficiency of the industry in the future.

In order to develop this assertion, in the first section the paper analyses the background of the BEI. This section summarizes the traditional pattern of development of BEI to arrive at a panoramic view of the industry's structure. Section 2 describes the main feature of the crisis in the BEI. In section 3, the paper summarizes the recent economic transformations in Brazil and the macroeconomic stabilization program. Section 4 gives a picture of the "state of the art" of the liberalization reforms and the privatization process

under way in Brazil. Finally, section 5 examines the unsolved questions for the configuration of a new regulation framework. The paper analyses the risks associated with the current strategy of reforming the industry patrimonial structure before the solving the "unsolved questions"

The Background of the Brazilian Electricity Industry

The electricity industry in Brazil has followed the traditional pattern of development of most Latin American countries. In the early age of the industry, most utilities were isolated municipal utilities, with strong presence of foreign capital[1]. In Brazil, the expansion of the electricity industry took place with almost no government intervention until the 1930. In this period, the electricity industry evolved into a very concentrated structure, with two private industrial groups dominating 65% of the market[2]. Two factors drove the Brazilian public authorities to intervene in the electricity industry and to create specific policies to regulate this industry: first, the perception that private monopoly was about to develop in this industry, and second, the understanding that the established private firms were not able to expand the level of electrification of the Brazilian economy, investing in areas with lower market density. After 1945, the federal and the state governments played increasing roles in the industry. Public utilities were founded and almost all private utilities were bought by state or federal utilities. After this period, there was a political consensus concerning the public task of the electricity industry[3]. Therefore, given this strategic character of the electricity industry, the government decided to create a regulatory framework to allow the public sector to assume the responsibility of enforcing the development of this industry. Both federal and state governments played an important role in the development of BEI. The Federal government has concentrated its operation in the generation companies, while almost all states created their own electricity distribution companies. Today, the electricity industry comprises 64 companies (Figure 1). Eletrobras owns and controls four regional generation and transmission companies plus Itaipu[4]. This industrial organisation and regulation framework was very effective to support the expansion of the BEI. The electricity production has expanded at an annual rate of 9.7% between 1975 and 1980. Over 150 000 Km of transmission lines were built to interconnect many town grids. Today, there are two large interconnected grids[5], only the Amazon region remaining isolated. The total installed capacity reached 65 MW in 1998.

[1] See Martin (1966) for one analysis of the history of Brazilian energy industries.

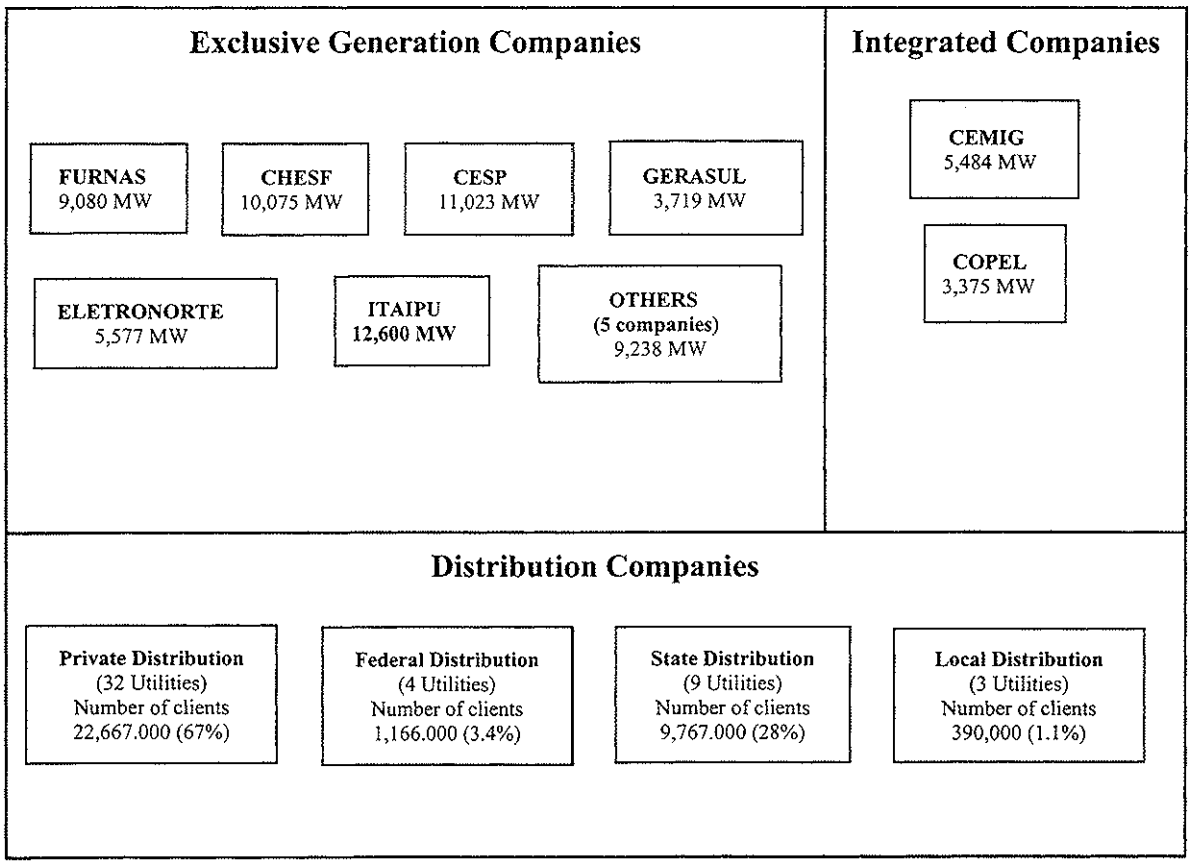
[2] These groups were LIGHT, a British group, and AMFORP of American origin. See Pinto Junior (1993).

[3] This political consensus took place in almost all other Latin American countries in this same period.

[4] This large hydropower plant (13,600 Mw) is a bi-national company (Brazil and Paraguay).

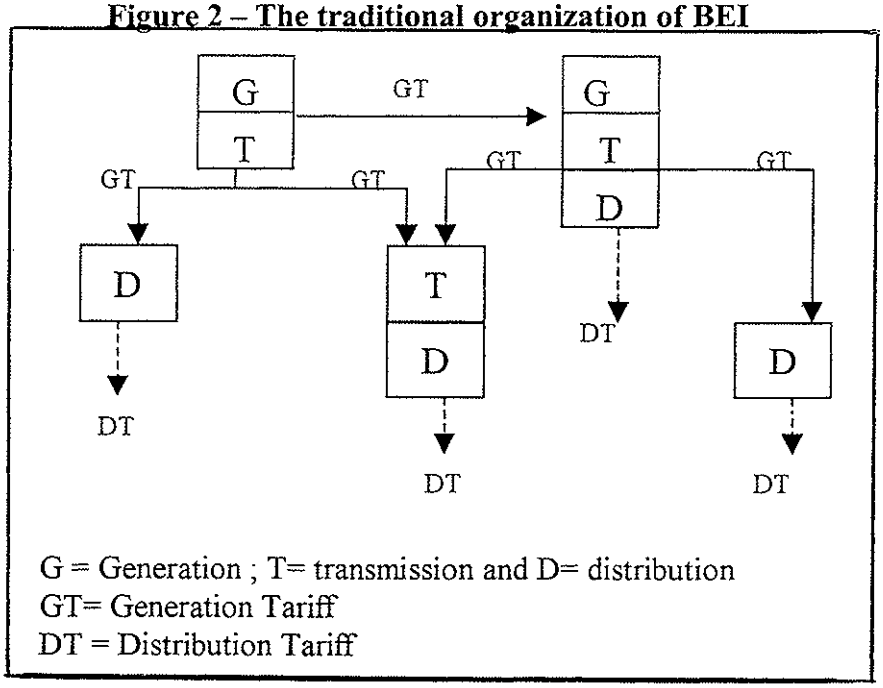
[5] The Center-South grid and the Northeast grid.

Figure 1 - Main Utilities in BEI



The historical pattern of development of BEI resulted in a very complex industrial structure. As we can see in the Figure 1, different types of utilities are present in the BEI. The majority of utilities are not vertically integrated and are specialized in the distribution segment. However, some integrated utilities play a very important role in Centre-South Brazilian grid, as in the case of CEMIG (Minas Gerais) and COPEL (Paraná). This complex industrial structure, with a mix of integrated utilities and non-integrated utilities cohabiting the industry, is a very important feature of the BEI, since it requires powerful co-ordination mechanisms. As we can see in Figure 2, we can identify different types of utilities and transactions in BEI. Some utilities have assets in the generation and transmission segment. They can sell electricity to distribution utilities or even other integrated utilities. The integrated utilities sell electricity to final consumers and to other distribution utilities.

Figure 2 – The traditional organization of BEI



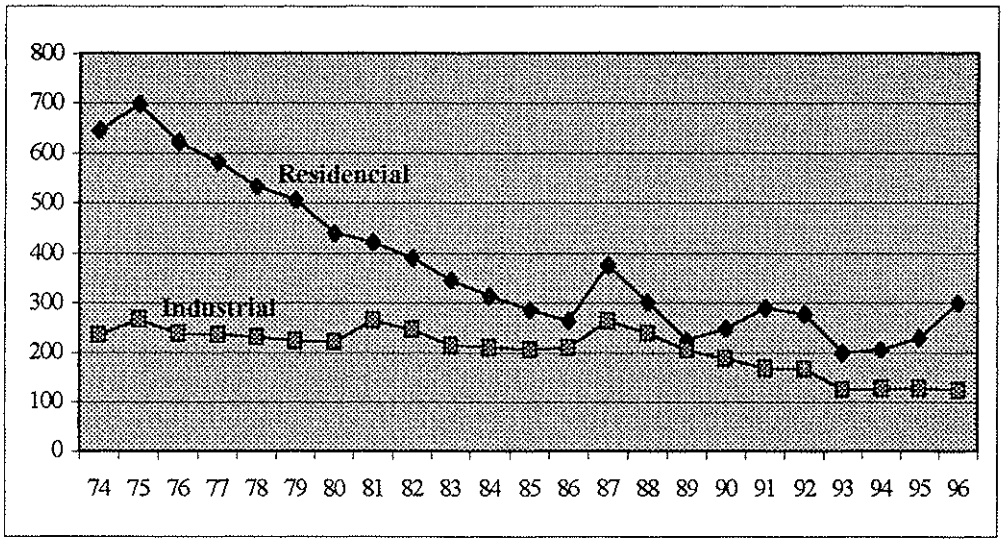
G = Generation ; T= transmission and D= distribution
GT= Generation Tariff
DT = Distribution Tariff

The Rise and Decline of the Public-Owned Electricity Industry

The creation of Eletrobas in 1962 inaugurated a very stable institutional framework to the expansion of the electricity industry. The economic risk of investment was very low since there was no market competition. A central plan for the expansion of the systems was systematically made by Eletrobras and the role of each agent was well specified in this planing. The tariffs were also decided by Eletrobras and were fixed in terms of cost-plus pricing. The investments made by public-owned utilities have been financed by a mix of own resources and internal and foreign loans. This last component has been very important in the 1960s and 1970s. The high liquidity of the international money market allowed the BEI to expand their investments in large hydroelectric projects. This stable institutional framework and the availability of financing resources made possible the expansion of the electricity industry within the virtuos circle context described above. The interconnection of networks allowed not only the reduction of cost but also the improvement in the service quality.

The debt crisis in 1982 has inaugurated a complete new phase for the BEI. After the Mexican moratorium, the interest rates rose to unprecedented levels and international financial markets stopped the voluntary credits to other Latin American countries. This rupture created very important financial constraints to the electricity industry. These financial constraints were aggravated by the Brazilian macroeconomics crisis that followed the debt crisis. The recession and inflationary spiral installed in Brazil spurred the Government to control the electricity tariffs as an anti-inflationary mechanism (See Figure 3). This policy reinforced the financial squeeze of the electricity industry. This extremely difficult financial context contributed to deteriorate the financial situation of the public utilities. The debt (mainly foreign) of public utilities jumped from $5 billion in 1975 to $23.8 billion in 1984.

Figure 3 - Electricity Constant Average Prices (US$/boe)



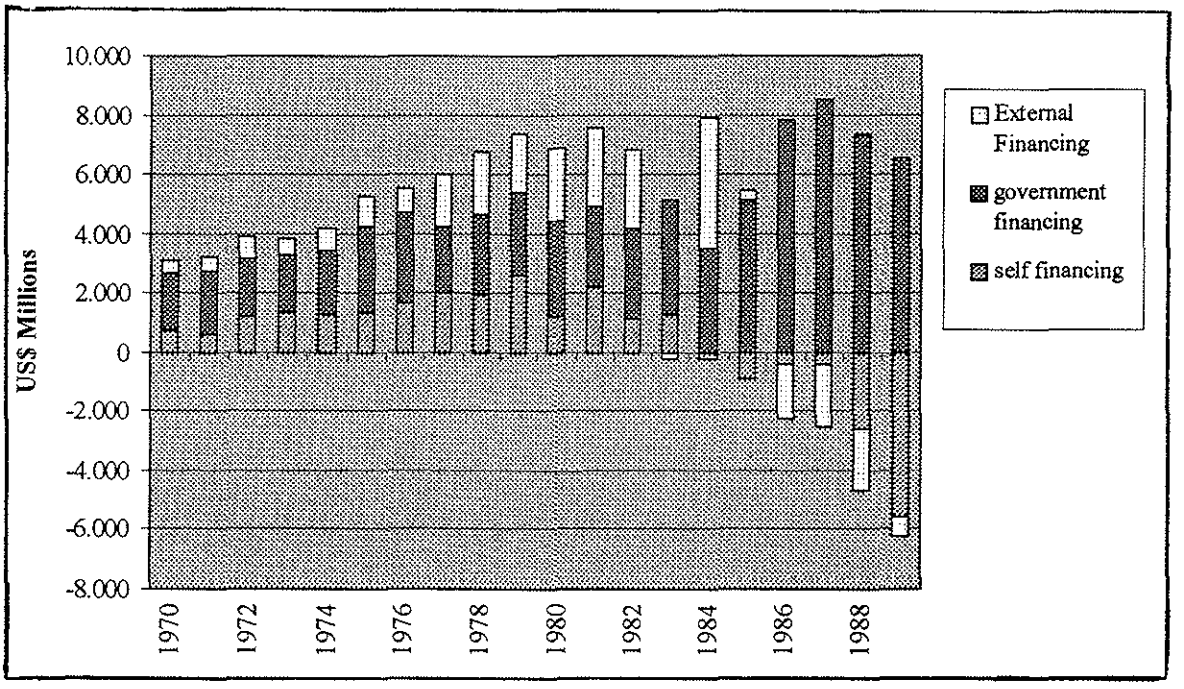
Source: National Energy Balance

The strong reduction of self financing, due to government's tariffs control, and decrease in the international financial flows have heavily affected the investment level in BEI (see Figure 3). The deterioration of the financial situation of most important electric companies became one of the main constraints to raise funds to new investment projects. As we can see in figure 4, the external financial flows for investments turned negative after 1982. In order to compensate the constraints to raise funds at the international market, the Federal Treasury had to increase its financial support to BEI.

The lack of resources for new investments in the 1980s was partially compensated by a decrease in the rate of expansion of demand. The annual rate of expansion of demand, that had been 11.7% in the 1970s, was reduced to only 5.7% in the 1980s. Therefore, despite the financial squeeze, the service quality could be preserved in the 1980s. Although the level of electrification in Brazil can be considered satisfactory[6], the rate of expansion of demand will remain quite high in the next two decades (Oliveira and Almeida, 1995). The volume of financial resources required to face this expansion is estimated in $ 5 billions each year (Pinto Junior, 1995). The institutional framework delineated by the public-owned electricity industry failed to adapt to the new international financial context of the 1980s. The crisis in the Brazilian public sector reinforced the feeling that this institutional framework was inadequate to the enforce a new age of rapid expansion of the Electricity Industry. Therefore, in 1993 the Brazilian authorities started to search for a new institutional framework to regulate the electricity industry, aiming to solve the financial constraints in order to allow further expansion of the industry.

[6] In 1996, 93% of Brazilian householders had electricity supply, the remaining non-connected families are living in rural areas, distant from the main urban areas.

Figure 4 – Evolution of the financing structure in BEI



Source: Pinto Junior (1993)

Recent Macroeconomic Reforms in Brazil

The crisis of the energy sector was strongly associated with the crisis of Latin American pattern of economic development in the 1980s (the so called "lost decade"). The answers given to the macro-economic crisis include the reforms in the electricity industry. In the Brazilian case, the industry efficiency argument is considered only at a second stand in the reform process. By far the main objective of Brazilian economic authorities is to produce a new macro-economic order to free the economy from the constraints and consequences of the debt crisis. In the 1980s, several stabilisation programs have failed to produce macro-economic sustainable stability in the Brazilian economy . Therefore, after 15 years of the debt crisis, the main political and economic priority of the Brazilian government is still the macro-economic stability.

The current stabilisation program, named the Real Plan[7], started in the government of President Franco (1993-1994) and has been very effective in the control of inflation rates. The inflation rate was extremely high during almost all period of the 1980s and first 1990s[8]. The set of economic measures introduced by the Real plan resulted in the drastic reduction of the inflation rate. The annual inflation rate was reduced from approximately 1,000% in 1993 to less then 10% after 1995.

The key features of the current stabilisation program were the monetary reform, the control of the exchange rate and the opening of the economy for foreign trade and investments, and the promotion of structural reforms in the public sector, notably in the infrastructure sector. The monetary reform represented the rupture with the

[7] That's the name of the new Brazilian currency.

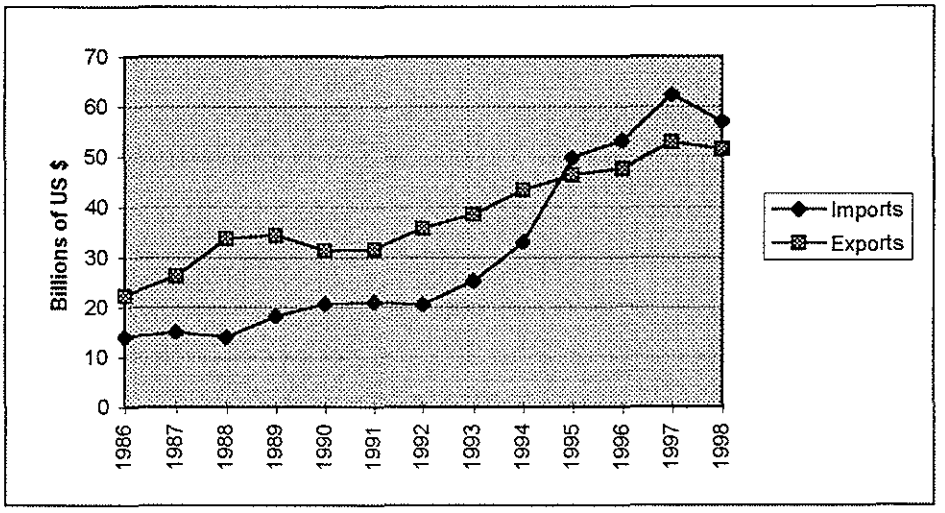
[8] The average annual inflation rate in the period 1982 to 1994 was almost 1000% a year. This figure is very fluctuating according to the year due to the consecutive stabilization programs tried in this period.

tradition of price indexation. The strategy of liberalisation of international trade had started before the Real Plan. In 1994, the government took advantage of the unprecedented high level of foreign currency reserves and promoted a shock of imports competition in the economy. In the same time, the Central Bank has been very strict in the protection of the Brazilian currency from devaluation. Similarly, the monetary policy has been extremely restrictive, with very high interest rates[9], in order to avoid attacks against the Brazilian currency.

The results of this stabilisation program was not only to control the inflation rates. Simultaneously, the liberalisation of international trade contributed to a rapid increase of imports ending a long period of surplus in the Brazilian trade balance[10] (figure 5). Between 1993 and 1997, while the Brazilian imports increase 143%, the exports expanded only 37%. In addition, Brazil. The foreign debt is very important ($ 192 billions in 1997) and, consequently, a significant amount of capital is required to service the debt's interest. As a result, the preservation of Real value became conditioned to the flow of foreign investments to Brazil.

At this point, the structural reforms in the public sector became a key element for the success of the stabilisation program. The process of privatisation is seen as an essential instrument to spur the flow of international capital to the country. In the last two years, the Brazilian government has promoted structural changes in the regulatory framework concerning the infrastructure sector, in order to induce the investments of private sector. Furthermore, the privatisation of roads, railways, ports, and network industries[11] have been an instrument to attract foreign investments, reducing at the same time the effect of the trade balance and public deficit in the economy.

Figure 5
Recent Evolution of the Trade Balance in Brazil



Source : Brazilian Central Bank

[9] At this moment the real interest rate in Brazil is about 35%, as a consequence of the financial crisis.

[10] Important share Brazilian economists sustain that this deficit in the trade balance was a result of an error in fixing exchange rate in the beginning of the program.

[11] Mainly the electricity, gas and telecommunications industry.

The Privatization Process

The privatisation program also started before the Real Plan. Between 1990 and 1993, all public companies in the steel, chemical, petrochemical and fertiliser industries were privatised. However, after 1993 the government decided to extend the privatisation project also to infrastructure sectors. Since then, a significant share of road system and the majority of railways network has been privatised[12]. More recently, the electricity industry inaugurated its round in the privatisation process. Since the beginning of the privatisation process, 64 public companies were sold generating about $ 68 billions of extra revenues for the public sector. The rhythm of the privatisation process has clearly intensified recently, since about $ 50 billions, out of 68, has been the result of the privatisation only in 1997 and 1998.

The privatisation program became a key element to support the Real Plan. Privatisations represent an important incentive for the attraction of foreign direct investment. These investments have been very important to equilibrate the balance of payments. The total deficit in the service and trade balance was $ 32 billions in 1998. The total foreign direct investment (including in privatisation program) increased from $ 9.9 in 1996 to 22 billions in 1998. By the enforcement of the privatisation program, the Brazilian government tries to avoid the Real's chronic devaluation.

The Market Oriented Reforms in BEI

The reforms in BEI started in 1993 with the Act 8631. The main objective of this act was to improve the financial situation of BEI aiming to prepare the public utilities for a future privatisation process. This was accomplished by allowing utilities to raise the tariffs, which had been held down in order to fight inflationary process; by ending a system of cross-subsidisation from low cost utilities to high cost utilities[13]; by adopting the price-cap tariff system, allowing utility's appropriation of efficiency gains as profits; and finally allowing the transfer of some excess debts which had been inflated by the financial crisis from the utilities to the federal treasury.

The BEI financial situation has improved substantially after this reform, allowing to rescue the utilities from a complete financial bankruptcy (Pinto Junior, 1997). However, the financial dilemma was not completely solved, since the resources for the industry expansion are not available in the Brazilian capital market or in the public sector. In order to face this problem the government is changing all regulatory framework to create conditions for the overall participation of the private sector in the industry.

In 1995, the Act 8987 was approved submitting all public services (including the network industries) to competitive bidding. Therefore, this act introduced competition for new generation projects. In the same year, the Law 9074 created the figure of the Independent Power Producers – IPPs. In addition, the large power consumers (more than 10 Mw) were allowed to buy electricity from any utility, including IPPs, ending captive markets in the utilities concession areas.

In 1997, the congress approved the Law 9427 creating a new regulator (ANEEL), more adapted to the new industry pattern of development. ANEEL is the new independent federal agency for the regulation of the generation, transmission, distribution and commercialization of electricity. The main attributions of ANEEL are:

- To organise auctions in order to make concessions to utilities in the production, transmission and distribution of electricity.
- To solve eventual conflicts between utilities, IPPs, self-producers, or merchant companies.

[12] In the case of public service industries the privatization has been done in the form of concessions. The government bid the right to explore the service for limited period of time. A new regulation of the concessions instruments was approved in 1995.

[13] Before this reform, the utilities profitability was guaranteed by cross subsidies. The utilities with better results were supposed to transfer their surplus to a fond, which was used to finance utilities with worse performance.

The concession contract establishes the technical and economic rules for the concessionaires. The most important economic rule is the type and level of tariffs. "Price-cap" replaced "cost-of-service" tariff scheme in all concessions in BEI. The concession contracts also establishes the rule for the evolution of tariffs and for partition of productivity increases between the utility and consumers. The technical rules concern mostly the service quality. Therefore, ANEEL is in charge of the verification that all economic and technical rules established in the concession contract are being respected by the concessionaire.

After the creation of the regulation agency, negotiations have progressed concerning the elaboration of wholesale markets. It has been decided to virtually unbundle the generation, transmission and distribution functions of current utilities. Finally, in 1998 an independent system operator (ISO)[14]was created, which will be responsible for the technical coordination of the systems and for the management of the transmission services. In order to operate the competition in the future wholesale market a specific institution called MAE (Mercado Atacadista de Energia) was created. The rules to operate the future wholesale market are not yet established[15]. However, ANEEL has decided to implement progressively the wholesale market until 2006. After 2001, the share of the wholesale market in the in total electricity transactions will increase by 25% annually. Therefore, by the year 2006 all electricity exchange will be done through the wholesale market.

The Privatisation of BEI

Even though, the market oriented reforms are not accomplished, the government has enforced a very important privatisation process. The government has not waited for the full establishment of the new regulatory framework because of the macro-economic motivations pointed out above. This process have been very successful until now, if we consider the prices paid for privatised utilities[16]. As we can see in table 1, 19 utilities has been privatised until July 1999. They are mostly distribution state owed utilities, since the economic risks in distribution segment are less important, and the potential to improve productivity is bigger in this sector.

The central government has created a very favourable context for the privatisation of state owned distribution utilities. On the one hand, the federal government has created financial incentives for the states who privatise their utilities[17]. The institutional reforms assured the profitability of the privatised utilities in the medium term. The tariffs are determined by the "price cap" system and current tariff levels are fixed for the next 5 years, allowing the privatised companies to appropriate all productivity gains within this period[18]. This context allowed the government to push forward the privatisation process notwithstanding the unfinished regulatory framework.

As we can see in Table 1, the volume of resources transferred to the public sector as a result of the privatisation process in BEI is very important. About 60% of these resources came from foreign investors, which have contributed to cover the deficit in the balance of payments. The foreign investments in the privatisation of the electricity industry represented roughly 40% and 30% of all direct foreign investment in Brazil in 1997 and 1998 respectively. These figures illustrates clearly the macroeconomic stakes of the privatisation process in the electric sector. For

[14] Named Operador Nacional do Sistema - ONS.

[15] As we will examine in the last section, this question represents one of the most important unsolved question to completely establish a new market oriented regulation framework.

[16] This price have been in average 50% higher than the minimum price established by the government.

[17] The federal investment banks have created special credit lines in the exchange of the future resources from the utilities' privatization.

[18] The tariffs will be augmented annually according to the Brazilian inflation rates. In the case of Light, the government allowed the appropriation of the productivity gains for the next 8 years.

this reason, the government intends to proceed with the privatisation process in the generation segment in 1998.

Table 1
Summary of the Privatisation Process Until December 1997.

Company	Date	Price (US$ billions)	Buyers
1) ESCELSA - Distribution Utility serving the State of Espirito Santo	1995	0.38	Brazilian and International Pension Funds
2) LIGHT - Distribution Utility serving the part of State of Rio de Janeiro	1995	2.2	AES (USA) 11,5% ; EDF (France) 11,5% ; Houston (USA) 11,5% ; CSN (Brazil 7%) ;
3) CERJ - Distribution Utility serving the part of State of Rio de Janeiro	1996	0.6	Chilectra (Chile) 42%
4) COELBA - Distribution Utility serving the State of Bahia	1997	1.57	Iberdrola (Spain) 39%
5) CACHOEIRA DOURADA – Generation utility	1997	0.7	Endesa (Spain) 60% and Edgel (Peru) 20%
6) ENERSUL - Distribution Utility serving the State of Mato Grosso do Sul	1997	0.57	Escelsa (Brazil)
7) CPFL - Distribution Utilitie serving part of the State of Sao Paulo	1997	2.74	VBC Energia (Brazil)
8) CEEE (North -northeast). Integrated utility, serving the North -northeast of the State of Rio Grande do Sul	1997	1.48	VBC Energia (Brazil) 66%; Community Energy Alternatives (American), 33%.
9) CEEE (Center -west). Integrated utility, serving the Center-west of the State of Rio Grande do Sul	1997	1.37	AES corporation (USA) 100%
10) CEMAT - Distribution Utility serving the part of State of Mato Grosso	1997	0.35	CSW (USA)
11) ENERGIPE – Distribution Utility serving the part of State of Sergipe	1997	0.52	Cataguases Leopoldina (Brazil)
12) COSERN	1997	0 .61	Iberdrola (Spain) Brazilian Pension Funds

Table 1 (cont'd)
Summary of the Privatisation Process Until December 1997

13) COELCE - Distribution utility serving the State of Ceara	1998	0.87	Endesa (Spain) and Enersis (Chile) 64%
14) METROPOLITANA – Distribution utility serving part of the State of São Paulo	1998	1.8	AES (Brasil); EDF (France); Houston (USA); CSN (Brazil)
15) CELPA - Distribution utility serving the State Pará	1998	0.39	Grupo Rede (Brazil) and Enepart (Brazil).
16) ELEKTRO – Distribution utility serving part of the State of São Paulo	1998	1.3	ENRON (USA).
17) GERASUL – Generation utility	1998	0.8	Tractebel (Belgium).
18) BANDEIRANTE – Distribution utility serving part of the State of São Paulo	1998	0.86	EDP (Portugal) and VBC (Brazil)
19) PARANAPANEMA – Generation utility	1999	0.69	Duke Energy (USA)
Total		**19.8**	

Source : Investnews database

The expansion of private sector participation in the electricity industry has not been limited to the privatisation process. After 1994, new electricity generation projects have been initiated with the participation of private investments. In the period 1994-1998, this type of projects have totalled about $ 8.1 billions of new investments in more than 8 GW of installed capacity (Pinto Junior, 1997).

The funding of long term investment projects has no simple solutions. The entry of private capital in new projects has been done mostly using "project financing"[19], in particular by the association of utilities and energy intensive industries. The risk for this type of arrangement is less important since we have a guaranteed market for the energy produced by the new power plant. This type of contract has been the most appropriate; however, the impact on investments has been limited so far, reflecting the high level of institutional uncertainties. A large share of potential projects for new investments are not developed due to high economic and financial risks. The conclusion of the institutional framework is essential to allow risk evaluation for successful project financing operations.

The Unsolved Questions

The challenge of the current trend of reforms in the electricity industry is to create a new regulatory framework, where the market can substitute for the industry's internal hierarchies in the task of orienting the allocation of resources and, simultaneously, improve the industry performance in terms of service costs and quality, as well as in terms of the industry's ability to cope with the evolution of the demand. The puzzle for the new regulatory framework is linked to the specificity of the electricity industry assets. In order to preserve or to improve the efficiency of the industry, the new regulatory framework has to take into account of the externalities and public good character of assets like transmission and distribution lines, dispatching boards and protocols and generation resources (Joskow, 1998). Therefore, the reform of the electricity industry involves the development of sophisticate co-ordination structures.

[19] In this type of financial arrangement, the investment payment is guarantee by the project's future cashflow and/or project's assets.

Glachant (1998) has shown that market mechanisms provide incomplete governance structures for transactions in the wholesale electricity market. Based on the UK's experience, he has shown that markets mechanisms are not able to completely replace integrated firms' hierarchies as a new governance structure. Therefore, hybrid governance structures have been built to fulfil the government requirements for the transactions in this market. These hybrid governance structures are represented by market mechanisms and the complementary rules defined by a private administrator (the Electricity Pool of England and Wales), which remains under influence of the British government. The electricity bids, which are made one day before its production and consumption, do not represent real confrontation of electricity supply and demand, since the demand considered in the bid process is not an effective demand but an estimated demand. The producers have no guarantee that the estimated demand will be confirmed and that their accepted proposals in the bid will be taken. Therefore, the bid price for the electricity is only one of the components for the real electricity price, which is also determined by technical variables managed by the Pool.

The operation of an electric pool is a very complex task that requires an appropriate governance structure. The bid mechanism does not solve concrete technical questions such as how to assure the system reliability ; how to face transport constrains in the dispatching ; how to avoid agent's opportunist behaviour that could affect the system efficiency. The task of this governance structure is indeed more difficult in developing countries (Teplitz-Sembitzky, 1990). In these cases, the governance structure faces a situation where the incentives to allow private investments for industry expansion must be sufficiently high to compensate the rapid pace of demand growth and the imperfections of capital markets in these countries.

In Brazil, the new governance structures will face several additional difficulties to co-ordinate the system operation and to guarantee the reform's goal (i.e. improved efficiency and expansion of the industry). One structural problem to the configuration of a new efficient regulatory framework to the BEI is the fact that the generation system in the country is quite specific as compared to other countries. Brazilian generation is essentially hydro (94%) and these hydro resources come mostly from only 3 river basins. There are very important technical interdependencies between the dams, which will be the future independent generation companies. Another problem is the fact that these companies may have a short term marginal cost of generation near to zero, in the periods of higher rain rates. In a totally free spot market, thermal generation would have real problems to compete with the hydro generation. This can be a real problem for the future wholesale market in BEI, since due to financial constraints most of future private investments in generation are intended to be in gas power plants.

Two federally owned generation companies are not to be privatised and also represent an obstacle to the conception of the electricity market. The Itaipu generation company is responsible for about 25% of Brazilian electricity. The cost of this electricity is considerable higher than the Brazilian average. Similarly, the nuclear generation company (Eletronuclear) produces electricity at higher costs as compared to the national average[20]. In the centralised dispatching scheme, Eletrobras has enforced the sale of this electricity to different distribution companies. Nevertheless, the creation of a competitive market raises two important problems: how to guarantee the dispatch of the electricity generated by these companies? What to do with these companies' huge debts, if the market decides that it is possible to get cheaper power elsewhere? In brief, the difficulty to set a regulatory framework to allow the development of a electricity market in Brazil is due, on one hand, to the hydro predominance of the system and the disparities of energy costs between generating companies. These disparities raise a problem for the distribution of economic rent in the inter-industrial and the regional levels. On the other hand, the complex ownership structure of BEI complicates the struggle for the

[20] The nuclear installed capacity today is 600 Mw, and will be tripled until 2001.

rent and makes it very difficult to elaborate a neutral regulatory framework.

Another difficulty is the fact that two important state owned utilities (Copel and Cemig) will not be privatised in the short or medium term. These are vertically integrated companies, and even though they have been forced to promote the accounting separation, it is not still clear if this will be enough to avoid the opportunistic behaviour that could disturb the functioning of the market. There is also a political problem on the demand side. The wholesale market will allow the sale of the cheap electricity generated within these states to other consuming centres. This idea seems not to please politicians and the state governments that control these companies.

Besides the difficulties mentioned above, the enforcement of the privatisation of BEI before completely reforming the regulation framework creates serious additional obstacles to the accomplishment of a successful market oriented reform. The high level of uncertainty concerning the industry future shape constrained policy makers to offer (or to accept) some attractive conditions in the concession contracts of the companies privatised so far. In some cases, these favourable conditions are not in path with the objective of improving the industry performance. The recent problems regarding the deterioration of service quality in some privatised distribution companies made clear the failure of some concession contracts. The case of Light (distribution utility serving part of State of Rio de Janeiro) was exemplary of this problem. In spite of the fact that this company respected all investments engagements of the concession contract, this company could not avoid power shortages in its concessions area. In 1997 and 1998, a very important number of black-outs took over the scene of Rio de Janeiro. The deterioration of the service quality was due to the replacement of the "cost-plus" to "price-cap" tariffs scheme. In the "price-cap" scheme, distribution companies try to minimise their cost in order to augment their profit margins. The new concessions contracts seems to impose insufficient constraints to the reduction of service quality. Therefore, the regulatory agency is facing a lack of effective juridical instruments to fight the deterioration of the service quality. This affair has contributed to erode the image of the privatisation process in the public opinion.

The privatisation of BEI is intended to be an important step towards the introduction of competition in order to raise efficiency and investments. However, the privatisation process so far has been made according to the established regulation framework, where the energy sales and the margins are pre-determided in the concession contracts. The introduction of new actors in the BEI with different economic interests mostly associated with old rules complicates the negotiation process for the introduction of competition and the development of the wholesale market. In these circumstances, these actors will tend to avoid stranded costs trying to create difficulties for the introduction of new competition rules that could jeopardise their current positions. For example, the predominance of "project financing" contracts in the new investments reduces the margin for the competition in a future generation market. We can assist future market where the expensive electricity of the "project financing" contracts must be dispatched before the cheaper available power. This situation could have as a consequence including the water spillage because of the priority to dispatch gas fired plants.

All these obstacles mentioned above are unsolved questions for the configuration of a market oriented reform of BEI. This type of reform is specially complex to conceive in a very specific electric industry such as the BEI. The specific characteristics of the BEI will need an equally particular governance structures in order to conciliate the incentives to private participation with the systemic efficiency requirements. Therefore, it is difficult to visualise the future shape of a competitive market for generation at this stage of the reform process in Brazil.

CONCLUSION

Recent reforms in the energy sector of developed countries have been induced principally by the search for increased industrial efficiency. However, in the case of most Latin American countries, the reforms in the energy sector can not be analysed independently of overall macro-

economic reforms. In the case of Brazil, the reform of the electric sector so far has clearly emphasised the privatisation process to the detriment of a new regulatory framework capable of inducing a more efficient allocation of resources in the industry. This privatisation process is central to maintain the current macro-economic policy. One of the consequences of the Real stabilisation program is the generation of a substantial deficit in the trade balance. The direct foreign investments, mainly through the privatisation program, are crucial to equilibrate the service and trade balance.

This paper has also shown that there are many unsolved questions concerning how to create a new regulatory framework, where the market can replace the industry internal hierarchies in the task of orienting the allocation of resources, augmenting at the same time the industry efficiency and the investment level. The recent privatisation process before a complete establishment of a new regulatory framework has not made easier the process of market reform. We have some evidence that pursuing the privatisation process without solving these questions can jeopardise the future efficiency of BEI. In a country where the demand for electricity is expanding at a rapid pace, time is a very important factor in the reform process. Because of the delay in establishing the new regulatory framework, important investments in the new generation capacity (including thermal plants) have been done, without to respect the logic of competition for the electricity market. Therefore, there is a clear trade off between the incentives required to engender private investments in a context of uncertain regulatory framework and the achievement of the reform's goals regarding the improvement of the sectors efficiency.

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