

Regulation and Competition Issues in the Electricity Sector¹

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Outubro/2002

¹ Este documento expressa as opiniões pessoais dos autores e não reflete as posições oficiais da Secretaria de Acompanhamento Econômico - SEAE.

² Este trabalho foi uma contribuição da Seae para a Mesa Redonda sobre Regulação e Concorrência no Setor Elétrico promovido pela Organização para a Cooperação e o Desenvolvimento – OCDE no dia 21 de outubro de 2002, em Paris, França. Contou com a participação dos seguintes funcionários: Claudio Monteiro Considera (Secretário de Acompanhamento Econômico), Francisco de Assis Leme Franco (Secretário-Adjunto de Acompanhamento Econômico), Maurício Pinheiro Canêdo (Coordenador-Geral de Serviços Públicos e Infraestrutura-COGSI), Celso Barbosa de Almeida, (Coordenador da COGSI) e Ernani Lustosa Kuhn (Coordenador da COGSI). A equipe agradece ao Sr. Isaac Pinto Averbuch, Diretor da Aneel, os comentários e observações sobre uma versão preliminar do trabalho. E-mail para contato: Seae@fazenda.gov.br. Esplanada dos Ministérios, Bloco P, sala 309, Ed. Sede, 70048-900, Brasília-DF. Tel: (61) 412-2358. Fax : (61) 225-0971.

RESUMO

Este trabalho descreve as recentes mudanças no setor elétrico no Brasil. O Governo brasileiro regula o setor elétrico com o objetivo de promover a concorrência a fim de possibilitar a obtenção de energia pelos consumidores a baixos preços e, ao mesmo tempo, permitir aos investidores receber um retorno adequado aos seus investimentos. Para tanto, o setor elétrico brasileiro tem sido dividido nas atividades de geração, transmissão, distribuição e comercialização. As atividades de geração e comercialização estão sendo reguladas o mínimo possível e estão tornando-se atividades competitivas, dirigidas por empresários do setor privado sob seu próprio risco. Já as atividades de transmissão e distribuição, consideradas monopólios naturais, permanecem como setores regulados. As companhias federais, assim como algumas empresas estaduais, estão sendo separadas em empresas de transmissão e de geração antes de serem privatizadas.

Apesar de o Governo ter efetuado algumas modificações estruturais no setor elétrico, ainda observa-se uma série de problemas no setor. O mercado de comercialização de energia elétrica ainda não está funcionando plenamente, pois a demanda tem sido inferior às projeções feitas no início do ano 2000, em decorrência da crise de oferta verificada em 2001. Ao mesmo tempo, muitos agentes sobretudo do setor de distribuição estão enfrentando problemas financeiros, já que contrataram empréstimos em dólares americanos, sem ter feito operações de hedge. Assim, as empresas têm pleiteado novos aumentos de tarifas à Aneel, que poderiam aumentar os custos industriais e reduzir a competitividade nacional. As decisões finais sobre os problemas concorrenciais do setor deverão assumir um lugar de destaque na pauta do próximo Governo que iniciará suas atividades em 2003.

SUMMARY

This paper intends to describe and analyse the recent changes in the electricity sector in Brazil. The Brazilian government regulates the energy sector with the objective to promote competition, in order to allow consumers to obtain energy with low prices and investors to receive a just return on their assets. In this sense, the Brazilian electricity industry has been divided in generation, transmission, distribution and retailing to obtain the best results. Generation and retailing are being regulated at a minimum level and becoming competitive activities, ran by the entrepreneurs at their own risk. Transmission and distribution, considered as natural monopolies, remain as regulated activities. The Federal companies, as well as some state companies, are being separated in transmission utilities and generation companies before privatisation.

Although the government has made structural reforms to improve the market mechanism on the electric sector, many problems still occur. The market is not working as expected because consumers would not be able to pay the prices necessary to maintain the financial and economic balance of firms. Demand is currently lower than the forecasts done in the year 2000, reflecting the supply crises that happened last year. At the same time, agents, mainly private distributors, are facing serious financial problems because they have contracted many loans in US dollars and with the devaluation of the Brazilian currency Real in relation to US dollars, these loans became an additional burden to their financial health. In order to reduce their financial problems, private agents in the energy sector are requesting that ANEEL increases the tariffs charged to the industrial sector (currently they consider this tariffs as low), or charges old energy (initial contracts) to residential consumers and new energy (more expensive in the bilateral contracts) to industries. Although in this year many important decisions are being taken, in the next year, Brazil will have another government from January 2003, when these issues will be decided.

1. INTRODUCTION

The Brazilian government regulates the energy sector with the objective to promote competition, in order to allow consumers to obtain energy with low prices and investors to receive a just return on their assets. In this sense, the Brazilian electricity industry has been divided in generation, transmission, distribution and retailing to obtain the best results. Generation and retailing are being regulated at a minimum level and becoming competitive activities, ran by the entrepreneurs at their own risk. Transmission and distribution, considered as natural monopolies, remain as regulated activities. The Federal companies, as well as some state companies, are being separated in transmission utilities and generation companies before privatisation.

This paper intends to describe and analyse the recent changes in the electricity sector in Brazil. The paper is divided as follows: section II presents an overview of the Brazilian electricity sector; section III describes the main characteristics of the electric market in the country; section IV analyses the division of the electric sector and the main rules in the field of competition adopted in Brazil; section V describes how prices are set in the sector, including the first large bid of energy and the measures adopted to avoid anticompetitive practices and section VI presents a brief conclusion.

2. OVERVIEW

The Brazilian electricity sector, as in other countries, was formed by vertically integrated companies. The production and long distance transmission activities were concentrated in federal and state companies³ and the distribution was concentrated in state companies.

The Brazilian electricity regulatory model started to be restructured in 1995, when the Law 9,074 was approved by the Congress, defining the regulation model and introducing the first steps towards competition and the government started privatising its distribution companies⁴.

In December 1996, the Law 9,427 created the Brazilian Electricity Regulatory Agency – ANEEL, established under a special administrative regime with financial and administrative autonomy⁵. ANEEL started its activities on December 2 1997, with five Directors, indicated by the President of the Republic and confirmed by the Senate for a fixed mandate. It was created with the mission of provide favourable conditions for the development of the electricity market, based on balanced relationship among its agents for the benefit of society.

An important step in terms of competition was taken in May 1998 by the Law 9,648, which established the Wholesale Energy Market – MAE, created the Independent System Operator – ONS, instituted free purchasing of power for the distribution companies, and created a new agent, the retailer⁶.

³ Federal companies: Eletrosul, Furnas, Chesf and Eletronorte. States companies: more notably, São Paulo State Company - Cesp, Paraná State Company - Copel and Minas Gerais State Company – Cemig.

⁴ Light, in the State of Rio de Janeiro, and Escelsa, in the State of Espírito Santo.

⁵ Also, their decisions are taken under collegiate rules of procedure.

⁶ The retailer (or broker) is a new agent that could operate in the electricity industry just buying and selling energy, without needing to own or build any facility such as generation plant, transmission lines or distribution network.

In June 2000, the National Energy Policy Council – CNPE was created with the duties and responsibilities to proposing national policies of energy, including the rational use of the nation's energy resources, guidelines for covering the use of natural gas, alcohol, coal, nuclear power and imports and exports of energy, among others.

From June 2001 to February 2002, the country has faced a supply crisis. The crisis occurred as a result of scarce rains and of delays in investments in plants and transmission lines. The administrative structure within the government is also starting to manage the new model in a totally different environment. The plan of action to solve the problem was the creation of the Crisis Cabinet⁷, a program for the reduction of demand⁸, an emergency program to increase the energy supply and the revitalisation of the model. Above all, the main objectives of the revitalisation project have been the following: the prevention of a possible crisis in the future, the reinforcement of market-based mechanisms, the creation of an environment to ensure adequate expansion of supply, stimulate competition, solve controversies related to non-manageable costs (as in the case of the prices of natural gas set previously in long-term contracts indexed to the US\$ dollar) and reduce its impact on prices.

3. THE MARKET

The main characteristics of the Brazilian electric market are the high dependence on hydrology and the huge transmission network lines. The 91 main hydroelectric plants belong to seven different hydrologic regimes and require more than 69.000 km of transmission lines to connect them with local distribution.

The main premise in the Brazilian generation planning is that the system is able to supply energy for the country 95% of the time. There is a risk of failure in hydroelectricity system of 5% (one year in a period of twenty years). The total current generation capacity of the inter-linked system is 72,810 MW⁹, as Table 1 shows below.

⁷ The Crisis Cabinet (or Administrative Committee of the Electric Sector Crisis) was created at the highest government level and its decisions did not depend upon other government instances. The head of the crisis cabinet was the Minister of the Civil Cabinet of the Presidency of the Republic.

⁸ The reduction of demand was 19% in average, comparing with the same period one year later. For the households it was 24,4%.

⁹ There are some local systems, mainly at the Amazon Region, that have more than 1.200 MW of capacity.

Table 1 – Installed capacity in 2001

SOURCES	W	%)
Hydroelectric	1,555	2%
Conventional thermal	,944	%
Nuclear thermal	,966	%
Wind and /small hydros	,345	%
TOTAL	2,810	2%
Imports from Paraguay (Itaipu)	,500	%
Imports from others countries	,150	%
TOTAL SUPPLY	9,460	00%

Source: Administrative Committee of the Electric Sector
Crisis

Although Brazil has currently a generation capacity higher than the demand¹⁰, the country has faced a supply crisis, as the level of water in the reservoirs decreased sharply in relation to historical levels. The structural program to solve the problem was created with the objective to increase additionally, until 2004, transmission lines by 9.250 km and power generation by 28,040 MW, as shown in Table 2.

Table 2 – Increase of supply in the structural program

SOURCES	MW	Investments (R\$ Million)
Hydroelectric	9,990	11,239
Natural Gas Thermal	11,434	16,776
Emergency Thermal	2,153	2,974
Others(small hydros/cogeneration/wind)	2,067	6,195
Imports	2,386	1,317
TOTAL SUPPLY	28,040	28,040

Source: Administrative Committee of the Electric Sector Crisis

In reality the efforts to improve the supply of energy in Brazil started recently in 1995, when the government implemented the first steps in the privatisation programme. At first, the privatisation was based above all on the decisions of the National Privatisation Council - CDN. In this period, Light (EDF) and Escelsa (IVEN), two large distribution companies, were privatised. From this period until 1997, the Government, with the support of the World Bank, hired some consultants from the British Company Coopers & Lybrand to collaborate in the privatisation process. Many other electricity companies were privatised, such Eletropaulo Metropolitana - Eletricidade de São Paulo S.A. (AES), Eletricidade e Serviços S.A. (Enron),

¹⁰ The peak demand before rationing was 56,000 MW. During the rationing it was 44.000 MW.

Companhia de Geração de Energia Elétrica Paranapanema (Duke), Companhia de Geração de Energia Elétrica Tietê (AES), Companhia Energética de Pernambuco (Iberdrola) and Cia. Energética do Maranhão (Pennsylvania Power & Light). Tables 3.1 and 3.2 below present the main players on the generation and in the distribution market.

Table 3.1 – Main generation players

AGENT	Market Share
Eletrobrás S/A (Federal Government)	39,03 %
São Paulo State Government	13,54 %
Eletronorte S/A (Federal Government)	13,28 %
Tractebel Energia S/A	7,71 %
Minas Gerais state government	7,57 %
Furnas Centrais Elétricas S/A (Federal Government)	7,41 %
Paraná state government	6,28 %
VBC Energia S/A	5,46 %
Serra da Mesa Energia S/A	5,45 %

Source: ANEEL (Brazilian Electricity Regulatory Agency)

Table 3.2 – Main distribution (retail) players

AGENT	Market Share
AES International Holding Ltda.	16,12 %
Minas Gerais state government	12,27 %
EDP – Electricidade de Portugal	7,36 %
Paraná state government	6,32 %
Guaraniana Comércio e Serviços S/A	6,18 %
Enerpaulo – Energia Paulista Ltda.	5,56 %
Endesa	5,47 %
EDF – Electricité de France	5,22 %
Bank of Brazil Investment Fund	4,98 %
Santa Catarina state government	4,64 %
VBC Energia S/A	4,05 %
Enron South America Ltd	3,55 %
EPC – Empresa Paranaense de Comercialização Ltda.	3,55 %
Serra da Mesa Energia S/A	3,14 %
Iberdrola S/A	2,41 %

Source: ANEEL (Brazilian Electricity Regulatory Agency)

The changes in the regulatory field and the participation of private capital allowed the companies in the sector to recover their investments. The annual average growth of energy supply has increased from 2,428 MW (between 1981 to 1985) to 3,100 MW (1996-2000) and is expected to reach 8,432 MW (2001-2005). The basic transmission network has increased from an average of 686 km/per year (1990-1994) to approximately 2,500 km in 2002. In 2003, a substantial increase of 5,565 km is expected.

4. COMPETITION

The regulatory objectives of the Brazilian government is to promote competition, in order to allow consumers to obtain energy with fair prices and investors to receive a fair return on their assets. The main Rule in the field of competition is Resolution 094 set by ANEEL, which established the following market concentration limits: (i) in generation, the agent may not hold more than 20% of the national installed capacity and if its operates in the interconnected system of the South, Southeast and Middle-West regions may not hold over 25% of the installed capacity of this system and in the interconnected system of the North and Northeast regions may not hold over 35%¹¹; (ii) in distribution, the agent may not hold more than 20% of the national distribution market and if its operates in the interconnected system of the South, Southeast and Centre-West regions may not hold over 25% of the distribution market of this system and the agent operating in the interconnected system of the North and Northeast regions may not hold over 35% and also (iii) when a single agent is operating as generation and distribution, the arithmetic sum of its share of the national installed capacity and its share of the national distribution market may not exceed 30%, but this agent may acquire new stakes through the privatisation processes even if this exceeds the limits established within no more than 24 months. The distribution agent may not acquire more than 30% of energy from a generation agent that belongs of the same economic group. The Table 4 below presents these limits.

Table 4 – Market share limits for agents

	NATIONAL	SOUTH/SOUT HEAST/MIDL E-EAST	NORTH/NORTH EAST	OBSERVATION
GENERATION	≤ 20%	≤ 25%	≤ 35%	Higher level allowed when there is one plant in the area
DISTRIBUTION	≤ 20%	≤ 25%	≤ 35%	-
GENERATION + DISTRIBUTION	≤ 30%	-	-	-

Even if ANEEL determines ex-ante the rules for the maximum market share allowed by the agents, ex-post analyses are done by the Brazilian System for Competition Defence – SBDC¹². The SBDC is composed of the Secretariat for Economic Monitoring (SEAE) of Ministry of Finance, Secretariat of Economic Law (SDE) of the Ministry of Justice and the Administrative Council for Economic Defence (CADE)¹³, an independent body administratively linked to the Ministry of Justice. Also, the SBDC investigates and punishes anticompetitive practices cases. In order to improve the competition defense in the electrical sector, ANEEL and

¹¹ Stakes larger than the limits established above will be permitted, if there is only a single power-generation plant in a specific region.

¹² Recently, SEAE analysed some cases with respect to concession of new hydroelectric plants and selling of shares in hydroelectric plants already auctioned. All of them were approved without restriction.

¹³ CADE is an administrative tribunal and its decisions can only be reviewed by the judicial courts.

the entities of SBDC signed collaborative agreements. As agreed, ANEEL states its opinion in mergers and provide technical support in cases involving anticompetitive practices whenever it is necessary.

The sequential five-step framework for horizontal merger analysis presented at SEAE's and SDE's common guidelines are the following: (i) step I: consists in defining the relevant markets through the "hypothetical monopolist test"; (ii) step II: consists in calculating market-shares of the merging firms. The Guidelines assume, in general, that no unilateral market power is involved if post-merger market-share of the merged firm is less than 20%. The Guidelines also assume that non co-ordinated market power is generated if post merger market-share of the merged firm is less than 10%, or if the combined market-share of the four largest firms is less than 75%. Mergers that do not involve substantial market-shares are cleared without further analysis. If market-shares are significantly high, the analysis is carried on to the next step¹⁴; (iii) step III: corresponds to the examination of the probability of the exercise of market power. The Guidelines consider that a firm will find it profitable to increase its prices above competitive levels if its own demand is sufficiently inelastic. At this stage, the agencies will analyse, among other aspects, the volume of imports in the market; the likelihood, timeliness and sufficiency of entry; and effective rivalry between competitors. The assumption is that if the demand is inelastic enough, market power will probably be exercised if imports are not in place; if entry is not timely, likely or sufficient; and if competition among incumbents is low. If the agencies conclude that the firm is likely to exercise its market power, the analysis will then proceed; (iv) step IV: refers to the assessment of possible economic efficiencies of the merger. Economies of scale and scope; transaction costs reductions; the introduction of a new technology; the internalisation of externalities and the creation of countervailing market power are arguable efficiencies. However, any efficiency argument has to be merger-specific, and explicitly excludes pecuniary gains and any other income transfer between economic agents. In particular, the agencies will not consider to be merger-specific the ones that can be reached, in a period shorter than two years, by alternative means that involve less risks for competition and (v) step V: introduces a "balancing-test", where the agencies will weight the efficiency argument against the possible anticompetitive effects. The agencies will clear the merger whenever benefits are likely to be higher or equal than its costs; and recommend the merger to be blocked or conditioned to specific remedies, whenever the efficiency argument is not sufficient to counteract the possible anticompetitive effects of the transaction.

In order to allow open accesses to the transmission grid, the Government created the Independent System Operator – ONS that provides transmission services on behalf of transmission companies. All users (generators, distributors, retailers, and large consumers) contracted with ONS the conditions to use the grid in accordance with the provisions of the regulator, independent of the grid owners.

The activity of buying and selling energy, known as retailing, traditionally performed by distribution utilities, is considered an independent segment. Although several new firms have already been authorised by the regulator to operate as retailers, the distribution agents continue selling energy for their consumers. At the moment, ANEEL is determining that distribution companies have to separate their accountings in distribution and retailing, in order to provide services to all consumers in a non-discriminatory basis.

¹⁴ Some authors argue that market shares (or concentration indexes, like HHI) are not the best way to infer the existence of market power in electricity markets. At this moment SEAE is studying alternative market power indicators for electricity markets.

Consumers with a demand higher than 3 MW, connected to 69 kV and above are currently considered free consumers. They have the right to choose their suppliers: a producer, a retailer or even another distribution company that operates as retailer in another region. Although, according Light Company, the distributor in Rio de Janeiro, free consumers prefer to buy energy from the distribution agents because the tariffs, controlled by the regulator, remain subsidised. ANEEL has already announced that in the next few years, it will promote total competition in all levels of consumption. This means that distribution companies will lose the monopoly to sell energy for the non-competitive segment of market - small consumers, called captive consumers. In this sense, it is worth mentioning that the size of free consumers is decreasing. In July 2000, free consumers' size were set in ≥ 3 MW (69kV), will decrease to ≥ 50 kW in July 2003, until they become all free by January 2005.

5. PRICES

Until now, as captive consumers have not the right to choose their suppliers, ANEEL regulates their tariffs. The index to readjust annually energy tariffs is obtained with the formula below:

$$IRT = \frac{VPA_1 + VPB_0 \times IGP-M}{RA_0}$$

Where, IRT is the readjust index; RA is the total revenue earned by utility in the past twelve months; VPA is the total distribution exogenous (not manageable)¹⁵ cost, like the total energy purchase, subsidy for expensive energy suppliers and payments to access transmission system; VPB refers to the distribution endogenous (manageable) costs, fixed when the company was privatised; IGP-M¹⁶ is inflation index.

Also, in Brazil, concession contracts preview the revision of tariffs levels in order to verify if the economic and financial balances of the companies are being maintained as agreed in the concession contracts. After an initial period of 4 or 5 years, the regulator have to revise the tariffs and define an X factor, which will be added or subtracted from IGP-M for the next period¹⁷, with the purpose of sharing efficiency gains with the consumers.

Energy can be purchased in different ways. When distribution companies were privatised there were contracts between them and power generation companies. These contracts, called "initial contracts", will be finalised from 2003 to 2006 (25% each year, that is, 25% finishes in 2003, 25% finishes in 2004, and so on). This measure was adopted to avoid sudden rise in electricity prices for the captive consumers. The prices of energy of the initial contracts increase annually based on the IGP-M index.

¹⁵ It includes items as energy bought from Itaipu, which price is quoted in US\$, as established in an international treaty with Paraguay.

¹⁶ General Prices Index Market, calculated by Getulio Vargas Foundation.

¹⁷ It takes into account the utility costs, a fair return on assets considering an ideal structure of capital and a fair return on equity and tries to share with consumers' part of the gains in efficiency achieved in the precedent period.

With the end of the initial contracts, bilateral contracts¹⁸ must be signed between producers and retailers or consumers, or between retailers and consumers. The Brazilian regulation rule determines that distributors must contract 85% of the energy in the long run, and 95%, considering long and short run. These contracts contain terms, price, duration, point of delivery, guarantees and other conditions. The duration, from two to six years¹⁹, serves as a hedge against fluctuations of spot prices. A general rule defined by the regulator is that every retailer, including distribution companies and producers, must have at least 85% of its energy sales covered by bilateral contracts. The companies are free to negotiated bilateral contracts, but the prices could not be higher than the reference prices (VN) established by ANEEL²⁰. In February 2001, the reference prices, by source, were: competitive energy = R\$ 72,35 MWh, coal thermoelectric plant = R\$ 74,86 MWh, small hydroelectric plant = R\$ 79,29 MWh, biomass and residue-fuelled hydroelectric plant = R\$ 89,86 MWh, wind-powered plant = R\$ 112,21 MWh and photovoltaic solar plant = R\$ 264,12 MWh²¹.

Bilateral contracts are made directly between agents or through bids. Some private distributors buy through bids operated by the Bank of Brazil. A large bid occurred on last September 19th, when 25% of the energy initial contracts was negotiated. Exceptionally in this case, the Government determined that the Wholesale Energy Market – MAE (where short-term transactions of energy charged by spot prices occur) would be responsible for the supervision of the bid process. It was the biggest bid already done, corresponding to 3,900 MW of energy offered by the federal companies. The bid was mandatory for the federal generation companies (the “old energy”), but voluntary for some other companies (state owned and private joined the bid).

Since the amount of energy that would be offered was very big (3900 MW, in packs of 0,5 MW, in contracts for terms of 2, 4 or 6 years, for the interconnected system), it was possible for some buyers to acquire huge amounts of energy and after the bid use market power to resale the energy for very high prices.

In order to avoid this problem and other anti competitive practices, a set of rules was established by ANEEL. The main rules established were: (i) distribution companies and retailers could participate only as buyers; (ii) generation companies could participate only as sellers; (iii) those who participate as buyer cannot participate as seller and vice-versa; (iv) to participate in the bid, companies had to respect the restrictions about market share, self dealing, cross-participations in other companies and other societary vinculations; (v) the total bidding of a potential buyer (or group of buyer under the same holding company) cannot be bigger than 70% of the total energy offered for each term (2, 4 or 6 years); (vi) it was not applied for products with less than 100 packs of energy (50 MW) and (vii) sellers had to offer at least 10% of their total offers for each term of supply. It was not applied for products with less than 100 packs of energy (50 MW).

Before the bid, the agents (buyers and sellers) were invited by ANEEL to discuss the rules and their application. The bid took place in a internet site and about a third part of the

¹⁸ Also, a kind of long-term bilateral contract called Power Purchase Agreement – PPA has been promoting new investments in generation, as it reduces market risks to investors.

¹⁹ According Light, as the demand level reduced and an excess of supply in energy is expected for 2003-2004, the current prices are low and companies prefer contracts for two years.

²⁰ VN takes into account the projects underway, the expansions foreseen for the generating complex, the updating of plant costs, the bilateral contracts signed between the agents, and the policies and guidelines issued by the Federal Government.

²¹ The average exchange rate in September 2002 is R\$ 3,1/US\$.

offered energy was sold, and most of dealt prices were inferior to current prices contracted bilaterally.

When the level of energy contracted is different from the level of energy produced or needed, producers, retailers and free consumers can buy or sell energy in the spot market at the Wholesale Energy Market - MAE. Initially, the spot market was designed to allow agents themselves to create the rules. However, between 1998-2001, agents were not able to reach an agreement about the accountings rules, which forced the Aneel to interfere in the market by indicating the directors and the President of the MAE to regulate these accountings. Currently, prices are set weekly, but with three different prices during the day (hours with high demand, with low demand and with normal demand) based on statistics provided by the ONS²². Prices established by the MAE are based on: (i) information received by the ONS related to the quantity of energy dispatched; (ii) bilateral contracts registered at the MAE and (iii) mathematical model used by the ONS. MAE is still elaborating its accountings to proceed the payments among agents²³.

The spot market in Brazil has a special peculiarity as the energy produced is basically from hydroelectric power mills, belonging to different hydrologic regimes and, in many cases, disposed in cascade along the rivers. For this characteristics, and in order to reduce risks, the Brazilian systems consider the stock of energy as the stock of water in the reservoirs in the entire interconnected systems. That is, each generator company has a stock of energy (water) which is made available to its interconnected system²⁴. The ONS decides on how much and when these agents have to deliver energy through the interconnected grid, based on the water regimes; on how much water is accumulated in water power mills; on the expected level of rains for the next 2-3 years²⁵ and on the hour of the day, optimising the use of the water. It is important to underline that water belongs to the system, and each plant has its own “ensured energy”. Revenues are based on the “ensured energy”, not on the amount of water that effectively passed in the turbines.

Although this system reduces risks, because its acts as a hedge for all the participants in the interconnected system, it also creates a complex accountings procedures. Regulators, particularly the ANEEL and the MAE are elaborating the accountings methodology of the 105 agents involved in short-term operations. After this methodology is set, the MAE will proceed with the payments among the participating members through the Brazilian Company of Clearing and Custody (CBLIC-Cia. Brasileira de Liquidação e Custódia).

In Brazil, the operational costs of thermal energy are higher, because it uses gas, coal or similar inputs, but the cost to implement a thermal mill is much lower than a hydroelectric mill.

²² Each Friday, the Wholesale Energy Market Agent sets the three prices of energy for the next week. Each price corresponds to 8 hours-period, when daily demand changes. These prices are identical to all participants. Currently, are around US\$ 5,00 MWh. However, during the supply crisis in 2001, they reached up to US\$ 200,00 MWh.

²³ As the accountings rules are being established, in September 2002, the amount to be set among companies since 1998 are estimated to be around US\$ 2 billion. Companies that have to pay are saying that they can be bankrupt after these payments, while those companies that are going to receive financial resources are pushing the Government to finalise the process. Meanwhile, several companies are informing that they will prosecute the Government (and block temporarily the distribution of financial resources) if the rules are not satisfactory to them.

²⁴ These interconnected systems were developed according to the location of the power mills and the demand. A new legislation are been proposed to transform the four interconnected systems in two energy markets in order to improve competition. However, as the linkage among them is still not perfect, it can be affected by the ONS dispatch decisions and also by the prices in the spot market.

²⁵ In order to support its decisions, it is developing a mathematical model that considers the hydrology in Brazil in the last 70 years.

Under normal circumstances, the price of water is equal to the marginal operational cost. If the price of water is higher than the marginal cost of thermal energy, then these mills are requested to operate. Also thermal energy plants are requested to produce when a water mill is being repaired or in hours with high demand. The same is valid when nuclear mills are being repaired (as in the recent case of Angra I Nuclear Plant). The obligation of the ONS is to ensure the correct level of supply in the country, in spite of the short-term costs.

The transmission tariffs are established by a different methodology, called revenue cap. The revenue of each agent is defined in a competition process promoted by ANEEL. Winners of these tender offers are selected by their ability to conduct energy at the lowest transmission revenue. Their revenues are modified annually, by using the index IGP-M. Transmission costs (sum of the revenues of the transmission agents) are divided and paid by all consumers. According to the agents in private sector, there are not major problems with transmission of energy in the country. The transmission services fees can be compared to the fees charged for general Internet services, when only one fee is charged to obtain services in a certain period of time, regarding of the geographical area covered by these services. In the future, ANEEL intends to change the model by providing economic signals for generators and consumers to use the transmission system efficiently. It includes different tariffs for each node of the system to be applied to generators and, for the demand side, an average tariff to be applied to all consumers in each state of federation.

6. CONCLUSION

Although the government has made structural reforms to improve the market mechanism on the electric sector, many problems still occur. According to the agents of the energy sector, the market is not working as expected because consumers would not be able to pay the prices necessary to maintain the financial and economic balance of firms. Demand is currently lower than the forecasts done in the year 2000, reflecting the supply crises that happened last year (there was a decrease of 15% consumption in the last year). On the other hand, agents, mainly private distributors, are facing serious financial problems because they have contracted many loans in US dollars and with the devaluation of the Brazilian currency Real in relation to US dollars, these loans became an additional burden to their financial health.

In order to reduce their financial problems, private agents in the energy sector are requesting that ANEEL increases the tariffs charged to the industrial sector (currently they consider this tariffs as low), or charges old energy (initial contracts) to residential consumers and new energy (more expensive in the bilateral contracts) to industries. However, these proposals can increase industrial costs and diminish national competitiveness.

Although in this year many important decisions are being taken, in the next year, Brazil will have another government (elections will occur in October 2002). Decisions taken by the new government are going to be fundamental to the future success of the Brazilian energy market.