

## **Using the Value Added Statement to Measure the Return on Capital Used to Finance Assets of Brazilian Electricity Distributors**

*Máisa de Souza Ribeiro*

*University of São Paulo*

*Ariovaldo dos Santos*

*University of São Paulo*

**ABSTRACT:** The electric power sector is hugely important from an economic, political and social standpoint. The wealth created by this sector represented, on average, 2% of Brazil's GDP in the period from 1998 to 2002. By looking at the financial statements of companies in the sector, one finds a very low rate of investments, but that these firms are still highly indebted. As a result of this debt load and the respective increase in financial expenses, besides the lack of investments, most electricity distributors have been accumulating significant losses. The objective of this study is to examine the way these companies are financing themselves and how the wealth they produce is being distributed to internal and external financial agents. By means of their Value Added Statements (VAS), one can observe that the portion of wealth going to remunerate capital (own and third-party) has gone mainly to external financiers. Our research also shows that in the past three years, electricity distributors have been creating increasing levels of wealth, but the volume of assets necessary for its creation has fallen significantly.

**Key words:** *financing of assets, VAS, electric power.*

***Máisa de Souza Ribeiro***

Doutor em Controladoria e Contabilidade  
Departamento de Contabilidade da FEA-RP/USP  
Adress: Avenida dos Bandeirantes nº 3900 Sala 14C, Monte  
Alegre, 14040900 - Ribeirão Preto – SP – Brasil  
Email: [maisorib@usp.br](mailto:maisorib@usp.br)  
Telephone: (16) 36024747

***Ariovaldo dos Santos***

Doutor em Controladoria e Contabilidade  
Universidade de São Paulo  
Adress: Av. Prof. Luciano Gualberto, 908 - Prédio III, Cidade  
Universitária, 05508900 - Sao Paulo – SP – Brasil  
Email: [arisanto@usp.br](mailto:arisanto@usp.br)  
Telephone: (11) 30915820

## I. INTRODUCTION

The information traditionally provided by accounting statements has increased significantly in recent years, mainly due to the greater need for resources to finance economic activities. These resources typically come from two sources: financial institutions and the open market. Globalization has increased the range of opportunities, as well as the risks, and thus both investors and lenders have become more concerned with the way their capital is being used and with the guarantees of expected return. Accounting has responded by seeking to provide more information on companies' financial health and performance.

One of the new accounting tools, conceived to give better support to decisions, is the Value Added Statement, or VAS. Its purpose is to evidence the wealth generated by a company's activities and show how this wealth is distributed among the agents that participate in its creation.

The energy sector is one of the most important from various aspects: national, social, economic and international interests, among others. The years from 1996 to 1998 mark a watershed in the Brazilian electricity sector, during which the majority of companies, owned by the government from their inception, were privatized. The sector was already facing a serious shortage of new investments before the sell-off, and has continued to face serious problems in private hands, both from an absence of acquiring new assets and an increased debt burden.

This work analyzes the relation among the value added, the return on capital invested and the amount of resources that finance the set of assets of the electric power sector, by analyzing information from the balance sheets and value added statements of 30 companies in the sector in the period 1998 to 2002.

## II. METHODOLOGY

A characteristic of research studies is that they are preceded by indications of the questions and objectives to be addressed or attained. Another important aspect relates to the choice of priorities, since it is quite common initially to open a broad range of questions that can be studied.

There is no doubt that value added statements, prepared by conventional accounting means, have proved to be an excellent research tool, because the macroeconomic information they present are highly revealing of the relations between companies and society at large.

Lakatos and Marconi (1982, p. 121), speaking of the question to be explained in any scientific work, state that: "*The problem, then, consists of an explicit enunciation that is clear, understandable and operational, whose best mode of solution is a study or can be resolved by means of scientific processes.*" So, this work's main objective is to answer the following question: How have Brazilian electricity distributors been financing their assets and what are the relations between financiers and the amounts of their returns. No preliminary hypotheses have been formed, since this study is purely investigative in nature.

The first step in this effort was to analyze the literature and set priorities regarding the use and utility of value added statements. The second was to classify the study into two groups, according to the characteristics of their typologies, namely: *empirical-analytical* and *ex-post facto*. The first of these is related to the collection of the data and the resulting analysis of the results obtained from these data. In the second, the main characteristic is related to the empirical investigation and does not consider the control of independent variables, because the facts have already occurred and cannot be manipulated.

### III. VALUE ADDED

According to Martins (1997, p. 2) “*The concept of value added (or value aggregated) corresponds to how much a company adds value to what it pays to third parties as a reward to the market for what the company produces, processes, facilitates, etc.*”

Thus, the value added can be viewed as what the company aggregates to the inputs and services it acquires from third parties, in other words, the wealth added to the product or service by means of its operational process.

The electricity productive chain includes generation, transmission and distribution. Therefore, the *gross value added* created by an electricity distributor is given by the difference between the its revenues from consumers and the sum of the amounts paid to generators and transmitters and for the materials and services from third parties necessary to carry on its activities. The *net value added* is the gross value added minus the depreciation, amortization and depletion of long-term assets, known in the Brazilian electricity sector as “reintegration quotas”.

As can be seen, the added value represents the company’s contribution to wealth creation, and its optimization is extremely important to a country’s economic development. Hence, by examining the value added statement, along with the traditional financial statements, one can obtain very valuable information for a comparative assessment of the resources employed in the generation and distribution of wealth.

The model we used here is that developed by the Institute for Accounting, Actuarial and Financial Research (Fipecafi), because this model has gained wide acceptance in Brazil, and although not legally mandated, has been uniformly adopted by corporations, permitting comparison among different periods and organizations.

This model has two main parts: one demonstrating how much wealth the company generated in a certain year, and the other how this was distributed. It also has a third part, showing the added value received in transfer. This serves, among other uses, to enable reconciliation between the VAS and the statement of income.

The wealth generated is called value added because it represents how much the company added to the economy. The determination of this amount is based on gross turnover minus inputs received from third parties, which gives the gross value added for the period. Subtracting depreciation, amortization and depletion gives the net value added. The net value added can change as a function of the amounts received in transfer, which represent wealth generated by third parties. Examples of these transfers are financial revenues, equity pick-up (which can be positive or negative) and so on. The final added value will then be distributed among employees, the government, external and internal financing agents.

Studying the information contained in the VAS can provide evidence of the level of a company’s or sector’s contribution to the economy, and hence to the social and economic development of the region or country. It also provides evidence about which agents benefited more or less from the distribution of the wealth created.

### IV. . EMERGENCE OF THE VALUE ADDED STATEMENT

According to Cunha (2002, p.17), the VAS was first developed in England, gaining popularity with publication in August 1975 of the *Corporate Report* by the Accounting Standards Steering Committee (now called the Accounting Standards Committee), which recommended preparing such a statement to show how a company’s benefits and efforts were distributed among employees, providers of capital, the State and reinvestments.

According to Martins (1997, p.4 and 5), in Africa and India, the VAS is required of all companies wanting to do business, since such statements enable evaluation of the amount of wealth that can be created within the country.

In Brazilian academic circles, studies based on value added statements began at the end of the 1980s. The pioneers in publishing the VAS were: Telebrás in 1991; the former Companhia Metropolitana de Transportes Coletivos (CMTC) and Banespa in 1992; Federação Brasileira das Associações de Bancos (Febraban) in 1993; and the now defunct Mappin Lojas de Departamentos S/A. in 1994 (RIBEIRO, 1998, p.26 and MARTINS, 1997, p.4 and 5).

## V. AGENTS RESPONSIBLE FOR CREATING ADDED VALUE

Generating added value requires the use of labor and capital, both the company's own and from third parties, besides some guarantee of political and social order. The government maintains order, shareholders and external financiers provide capital, and the employees and service providers, of course, supply the labor. All these resources are remunerated in some way. Workers receive wages and salaries, shareholders get profits in the form of dividends or interest on stockholders' equity<sup>1</sup>, financial agents receive interest and rents, and the government takes its bite in taxes.

## VI. SOURCES OF FINANCING ASSETS

The origin of the funds used to finance a company's activities is of great importance, since it will be reflected in its equity situation, its results, cash flows, profitability, etc. Even a company's survival can be compromised by the way it is financed. Broadly speaking, companies can obtain financing from within or without, from third parties. On the balance sheet, money from third parties is classified under "*liabilities*", and that coming from the company's own resources, i.e., from shareholders or revenue streams, is booked under "*assets*". The portion of assets not distributed to shareholders is the "*net equity*".

Regarding the periods for paying debts to third parties, some factors have great bearing on the company's financial health. Ideally, all new capital outlays should be made with long-term funding, because the assets created will contribute to generate wealth over the long run. However, in counterpart to the longer term available to generate a return, the interest to be paid will be greater. Assaf (2000, p. 38) points out that:

*"(...) to achieve financial balance, it is essential for there to be a match between the maturity of liabilities and the capacity of the assets to generate revenue streams. A decision to use a short-term loan to finance fixed assets, for example, signals a deterioration of the firm's financial stability, making it dependent on rolling over short-term debts to maintain long-term assets."*

## VII. RETURN ON CAPITAL EMPLOYED

The return on a firm's own capital and that of third parties is correlated with the volume of this capital that enters the organization. As a general rule, this correlation is not proportional, since there are different rates among different loan contracts, along with the relative dependence on the economic and political conditions in effect at any one time.

---

<sup>1</sup> Interest on stockholders' equity is an alternative form of distributing dividends in Brazil, providing certain tax advantages to the firm. It was introduced as an option in 1996.

The various portions of the capital employed, whether of own or third parties, are remunerated in different forms and denominations. While the return on third party capital is under the denomination “interest and rents”, that on own capital is generally called “dividends” (or interest on stockholders’ equity), to which must be added undistributed profits.

Companies with greater participation of third-party capital tend to have higher financial expenses and also greater difficulties in obtaining further resources and more favorable payment periods and interest rates. Braga (1995, p.27) states that:

*“(...) the interest and other charges on loans and financing weigh down the economic results, reducing the portion of the profits that will remain for the shareholders. Besides this, the lenders may demand various types of security and contractual conditions that reduce the company’s management flexibility.”*

Ross et al (1997, p. 41) stress the fact that third-party capital has first call on the return on capital:

*“As a company borrows money, it generally must offer lenders preference on its cash flows. The owners only are entitled to the residual value, the part remaining after all payments to creditors. The value of this residual portion is the owners’ equity, the amount of the firm’s assets minus its demandable liabilities.”*

The authors also stress the power of financial leveraging by using the resources of third parties: *“The more capital from third parties a company uses (in proportion to its assets), the greater will be its financial leverage....”*. Like any leveraging, this can magnify both the potential gains and losses.

## VIII. . EFFICIENCY INDICATORS BASED ON VALUE

### **ADDED Value added versus total assets**

The ratio between value added and total assets represents how much each real of investment is generating in wealth for the company. This percentage is high in some sectors because they are not capital intensive, but instead labor intensive, a good deal of which can be outsourced. However, companies in the energy sector, which also render services, need to make huge outlays on equipment, machinery and installations to distribute their product. In this case, it is normal for the ratio between value added and amount of assets not to be high.

Ideally the assets should be able to produce wealth in a determined period sufficient to cover the company’s spending necessary for operation, maintenance and expansion, including depreciation and payoff to the capital employed.

It should be pointed out that the amount of assets used in this study is that stated in each company’s accounting statements. This does not always exactly reflect all resources used in generating revenue. In some situations long-term assets are acquired through time payments in the form of leasing, thus moving them off the balance sheet and classifying them as rental expenses rather than under fixed assets, as would otherwise be the case. This means that in these cases the correlation between the value added and total assets will be skewed, which can at times be relevant.

### **Value added versus capital structure**

The relation between the added value and the total capital (own and third-party) used to finance the assets sheds light on the capacity of the resources to generate wealth for the company. The product of this relation can be presented in detailed form, and indicated according to the structure of financing assets the returns going to the various holders of own

and third-party capital. Companies that require high outlays for physical plant need more capital, and this as a rule stimulates the entrance of capital from outside sources.

### IX. DATA COLLECTION

This study relies on the group of Brazilian electricity distributors that publish a value added statement.

Among the power companies operating in Brazil, four are involved in generation, transmission and distribution: Cemig, Chesf, Copel and Furnas. Two carry out two of these activities: CEEE (transmission and distribution) and Eletronorte (generation and transmission), with the latter being absent from the sample data.

Our analyses of accounting information, specifically the VAS, were performed from the statements available in the Fipecafi database, used for preparing the special annual *Melhores e Maiores* (“Best and Biggest”) edition of the Brazilian business magazine *Exame*. The publication of the VAS is encouraged by the organizers of this annual edition and by the Brazilian Securities Commission (*Comissão de Valores Mobiliários – CVM*). The following statements are available:

---

**TABLE 1**  
**Number of VASs published each year**

Period	Number of VASs
1996 – 2002	19
1997 – 2002	27
1998 – 2002	35
1999 – 2002	40
2000 – 2002	44
2001 – 2002	47
2002	53

---

Source: Fipecafi database.

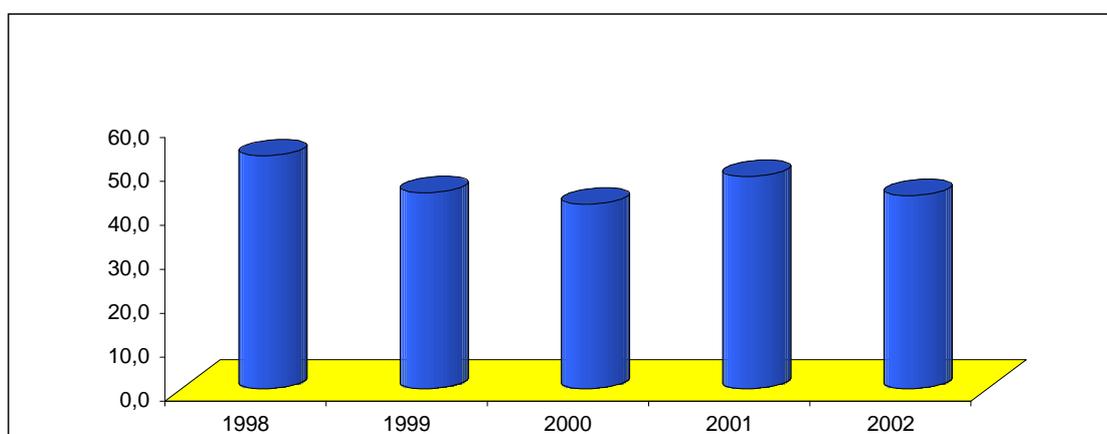
We chose the period from 1998 through 2002 for analysis because it contains an adequate number for statistical analysis and verification of trends (5 years). Besides this, it involves results resulting from an important event in Brazil’s economic policy, the floating of the *real* in early 1999, which caused a significant devaluation against the dollar. This had major impacts on the asset structure of companies depending on external capital. The sample contains 35 companies that presented value added statements for the whole period. Of this total, we excluded the companies in the database that have other activities besides distribution, so the final sample had 30 elements.

## X. ANALYSIS OF THE DATA

### Investment

The total value of the assets of this set of electricity distributors fell over the period from 1998 to 2002, from 53 to 42 billion dollars. This decrease is indicative of the fact that the companies in this sector have not been investing enough in the post-privatization period and partly explains the power crisis faced by the country. The graph below shows this pattern: from 53 billion dollars in 1998, the total assets fell to 44.6 billion in 1999, and bottomed out in 2000 at 42 billion, then rose to 48.3 billion in 2001, but finished 2002 at 43.9 billion dollars.

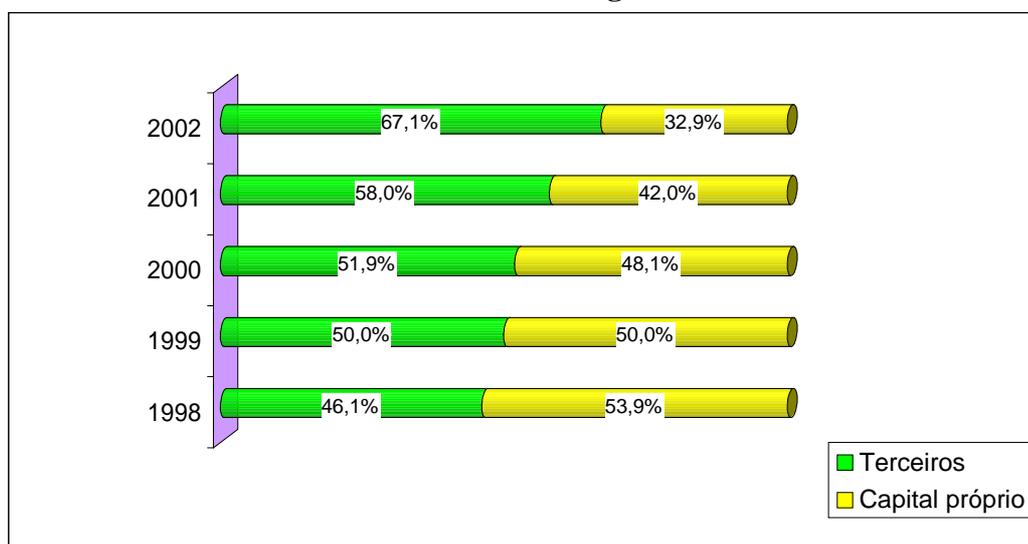
**GRAPH 1**  
**Total Assets – US\$ billion**



### Sources of financing assets

The form of financing assets is of great importance and must consider the cost of capital, time of return required and the capacity of such assets to generate wealth for the companies.

**GRAPH 2**  
**Sources of Financing Assets**

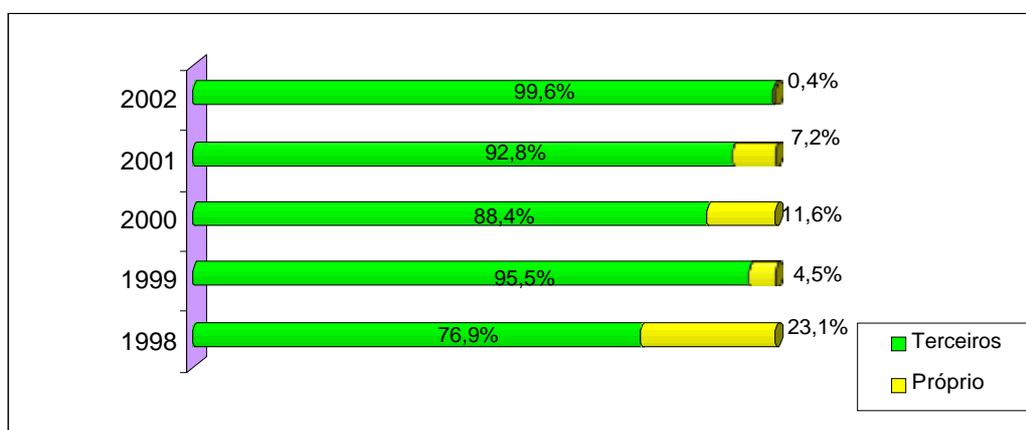


The data for the period show a steady reversal in the form of funding assets. In 1998, own capital was predominant, responsible for roughly 54% of the total resources invested in the companies. By 2002 this figure had shrunk to only around 33%, with the other 67% coming from third parties. This rise in electricity distributors' indebtedness level caused greater exposure to exchange rate and interest rate swings, and caused them to pare back investments previously promised or planned.

### Return on capital employed

The study demonstrated that the forms of remunerating capital are quite distinct, mainly if considering the origins of the capital used by the companies. The return on third-party resources was much better than that on own capital.

**GRAPH 3**  
**Return on Capital**



As shown by Graph 3, the remuneration of capital from outside parties grew in detriment to own capital, reaching the point where practically all the resources allocated for this purpose went to pay outside capital (99.6%).

### **Analysis of sources of financing versus return on capital**

Graph 3 shows that in 1998 the amounts going to external financial agents in contrast to internal ones were totally disproportionate or imbalanced. That year, external suppliers of capital received 76.9% of the total used to finance assets.

This became more imbalanced in 1999. One of its main causes was the abrupt devaluation after Brazil's currency was floated at the start of that year. The two groups (external and internal) provided equal contributions, but the "outsiders" absorbed 95.5% of the returns on capital.

A maxi-devaluation like 1999's causes two types of effects on the balance sheets of companies that are dependent on existing foreign currency loans. The first is immediate and directly affects the bottom line result, since the added financial expenses cut into profits or add to losses and cannot be passed through directly to their prices.

The second effect derives from the first, because the booking of exchange rate variations reduces the value of the net equity and simultaneously augments that of liabilities. Obviously this, depending on the amounts involved and the magnitude of the variations, can cause brutal shifts in the relation between internal and external capital.

Graph 2 shows that in 2000, the participation of third parties in financing assets became slightly higher than from own resources, however the remuneration of external capital continued significantly greater than own capital, albeit in a situation a bit better than the previous year, as shown in Graph 3.

In 2001, the situation of slight superiority of the index of financing by third parties continued (Graph 2), but the imbalance between remuneration of outside agents and shareholders became more pronounced (Graph 3).

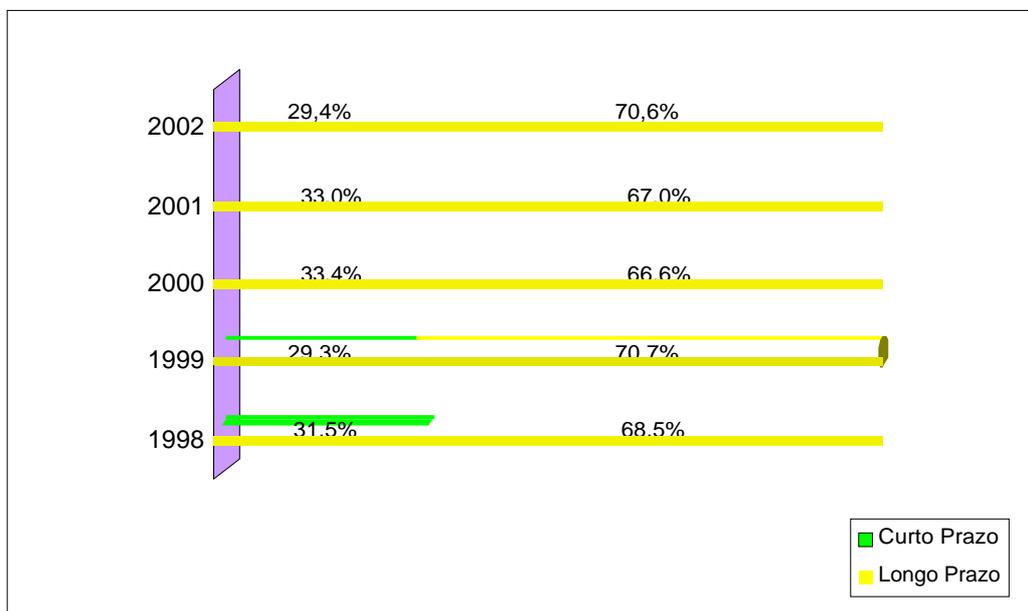
The greatest reduction in the participation of own capital in relation to that from outside occurred in 2002. That year, third-party capital rose to 2/3 of the total used to finance assets, leaving 1/3 for shareholders. However, even though the participation of shareholders had fallen greatly, it still remained significant. But the return on their capital was practically eliminated, with the portion remaining being only symbolic.

Analyzing these data with previous information shows that in no period was there equilibrium between the returns and volumes of own and third-party capital employed. The participation of shareholder capital fell steadily, and although this trend was by no means insignificant, it was dwarfed by that for return on capital, where in the last year the remuneration to shareholders was practically nil.

### **Debt maturity profile**

The data on the composition of debt reveals a relatively stable picture over the period analyzed. In general, 30% of the debts were classified as payable in the short run and the other 70% in the long run. This can cause greater financial expenses, but it has the benefit of leaving more time to manage cash flows and generate resources to pay off the debts assumed.

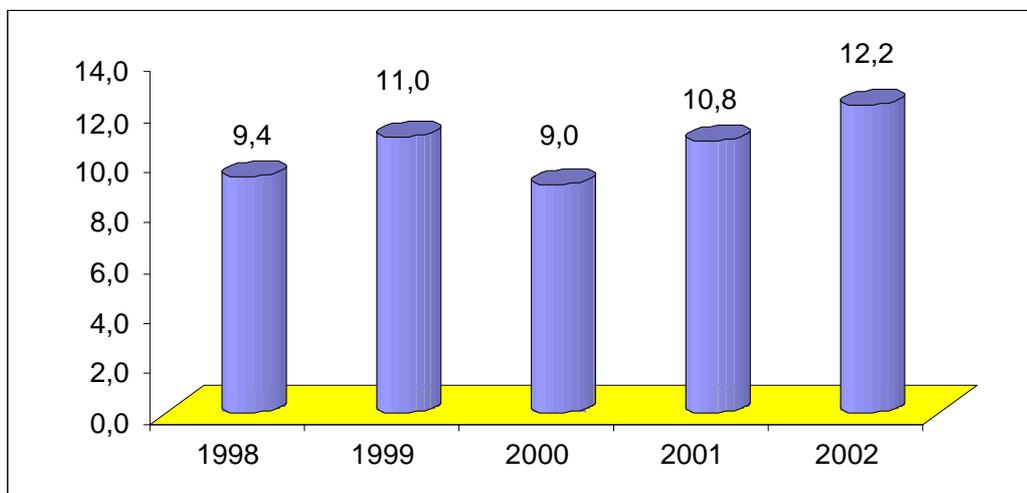
**GRAPH 4**  
**Debt Maturity Profile**



**Value added by the sector and Brazilian GDP**

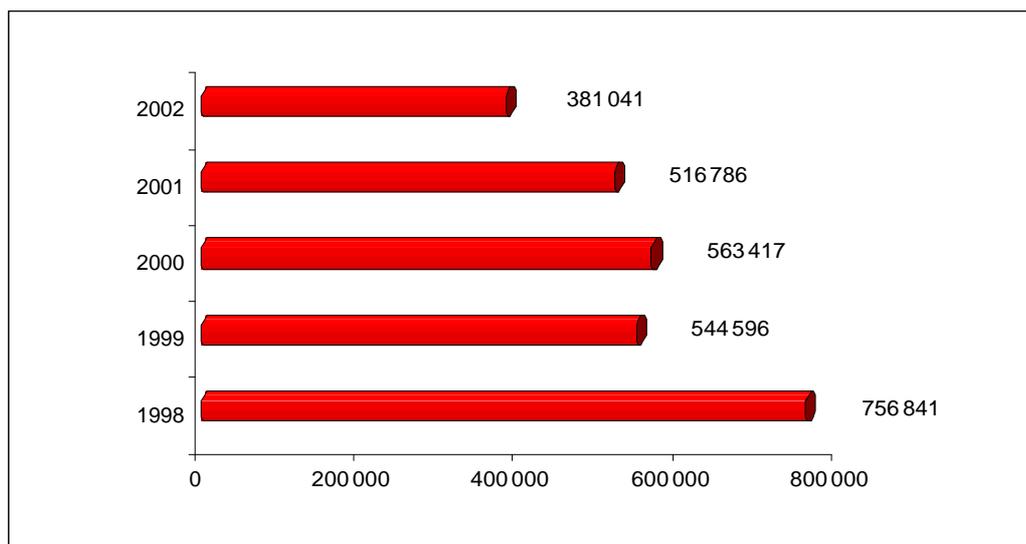
The amount of wealth created by the companies analyzed remained over the study period between 9 and 12.2 billion dollars, with a gradual upward trend over the last three years.

**GRAPH 5**  
**Value Added (US\$ billion) – 12/31/2003**



However, the country's GDP suffered a pronounced fall over the period, from the equivalent of 756.8 billion dollars in 1998 to only 381.0 billion in 2002, according to data from the Brazilian Institute of Geography and Statistics (IBGE). So, despite all the difficulties experienced by the electric power sector, the trends of its results are better than those of the national accounts.

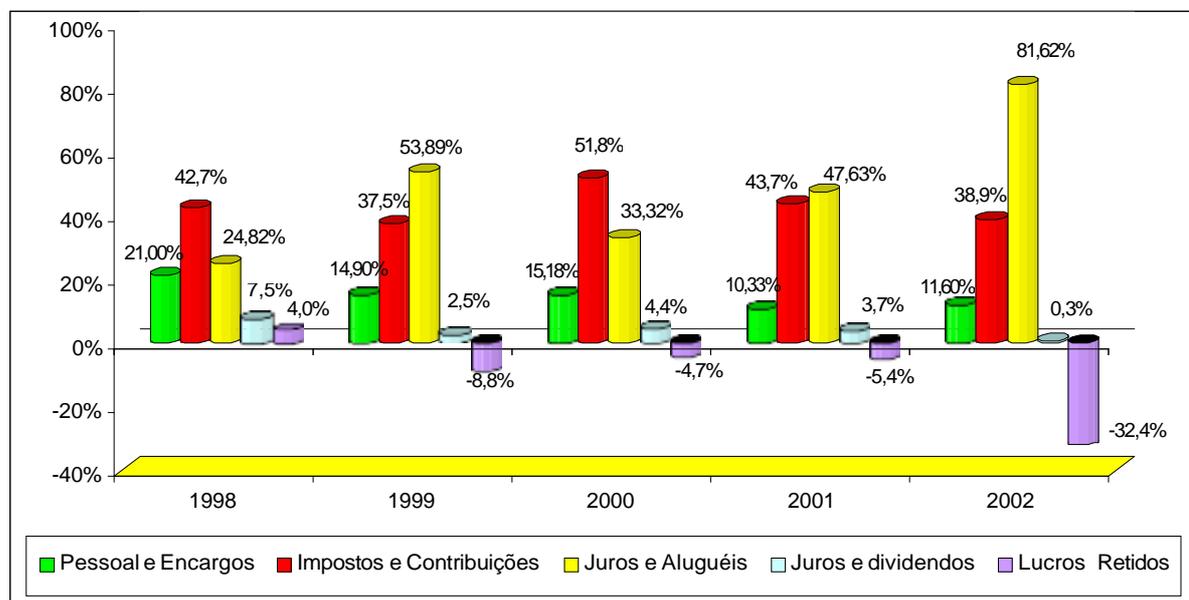
**GRAPH 6**  
**Brazilian GDP in US\$ billion (IBGE)**



### **Distribution of value added**

The way the wealth created by the companies is distributed is one of the main elements of the value added statement, since it shows the relative remuneration of the economic agents responsible for creating this wealth. In the companies studied here, the remuneration of third-party capital was highly relevant and surpassed that of “taxes and contributions”, which normally for companies in the electricity sector represent the most important part of this distribution. Graph 7 shows the distribution of added value of the electricity distributors over the study period.

**GRAPH 7**  
**Distribution of Value Added**



### Value added versus volume of investments in assets

Investments in assets are necessary to enable a company to operate, and thus enable it to create wealth. Below in Table 2 we present a summary and comparison of the amounts invested and the respective wealth generated.

**TABLE 2**  
**Value added compared with total assets**

	Value Added US\$bi-12/31/2003	Total Assets US\$ bi-12/31/2003	VA / Total Assets (%)
1998	9.4	53.0	17.7%
1999	11.0	44.6	24.6%
2000	9.0	42.0	21.5%
2001	10.8	48.3	22.4%
2002	12.2	43.9	27.8%
Average	10.5	46.4	22.6%

It can be seen that the value added rose gradually, except in 2000 when it fell from the previous year's level. Nevertheless, the amounts invested in assets fell systematically in the period, except in 2001. The significant reductions in the value of electricity distributors' assets can have various reasons, including lack of new investments. Beyond this, the trend can be due to:

- Write-off of obsolete fixed assets;

- Use of idle capacity;
- Generation of wealth through use of third-party instead of own assets; etc.

We can see that the ratio between the value added and the amount of the companies' assets averaged 22.6%, about one-fifth. This is an absolutely normal outcome, in view of the huge volumes of assets required in distributing electricity.

## XI. FINAL CONSIDERATIONS

The electricity sector has all the characteristics to warrant attention by society, government, investors, financiers and employees, among others. Stress is often given to the need for new investments in order to renew technologies, expand the operating park and conduct research into alternative energy sources. Nevertheless, the new controllers, due to contractual provisions from the privatization process and also the huge amounts involved, have not yet initiated such investments. Emergency measures need to be taken, under the risk of a generalized collapse of the nation's economy, because the investments necessary to meet future demand are simply not being made. Although much of the sector is now in private hands, the fact is an essential public service means that any future energy crisis will always be blamed primarily on the federal government.

From observing the composition of the resources that finance the companies studied, it can be said that the situation is truly worrying, because the companies have been growing ever more indebted, with higher costs, seriously compromising their ability to generate profits and attract new investments. The participation of external capital grew over the period analyzed, mainly because of the effects of two devaluation episodes. These devaluations simultaneously caused increased debt loads and reductions in net equity. In 1998, the electricity companies studied were funded equally by shareholders and external financing, but at the end of 2002, external capital was responsible for 67% of the total.

Another important factor observed was the total imbalance in the amount of resources destined to remunerate these two portions of the capital. This disparity was so stark that in the last year, 2002, 99.6% of the resources destined to remunerate capital was absorbed by external financial agents. In other words, own capital financed 33% of the assets and received only 0.4% of the return.

The study also showed that in the last three years studied, the wealth created by the electricity distributors grew, although the volume of assets necessary to generate this value went down significantly.

## REFERENCES

- ASSAF, A. *Estrutura e análise de balanços: um enfoque econômico-financeiro*. 5th Ed. – São Paulo: Atlas, 2000.
- BRAGA, R. *Fundamentos e Técnicas de Administração Financeira*. São Paulo: Atlas, 1995.
- CUNHA, Jacqueline Veneroso Alves da. *Demonstração contábil do valor adicionado – DVA – Um instrumento de mensuração da distribuição da riqueza das empresas para os funcionários*. Masters dissertation – Faculdade de Economia e Contabilidade da Universidade de São Paulo. São Paulo: FEA/USP, 2002.
- HALLER, Axel; STOLOWY, Hervé. Value added in financial accounting: a comparative study of Germany and France. In: *Advances in International Accounting*. p. 23-51, 1998.
- LAKATOS, Eva M.; MARCONI, Marina A. *Metodologia Científica*, São Paulo: Atlas, 1982.

- LARRAZ, José Luis Gallizo. *El valor añadido en la información contable de la empresa: análisis y aplicaciones*. Madrid: Instituto de Contabilidad y Auditoria de Cuentas, 1990.
- MEEK, Gary K.; GRAY, Sidney J. The value added statement: an innovation for U.S. companies, p.73-81, June 1988.
- MORLEY, Michael F. The value added statement in Britain. *Accounting Review*, p. 618-629, July 1979.
- MARTINS, E. Demonstração do valor adicionado – Alguns exemplos reais. Temática Contábil. *Boletim IOB* 31/97. São Paulo.
- MARTINS, E. Uma nova demonstração contábil no projeto de reforma da Lei das S/A: a do valor adicionado. Temática Contábil. *Boletim IOB* 29/97. São Paulo.
- RAHMAN, M.Z. The local value added statement: a reporting requirement for multinationals in developing host countries. *The International Journal of Accounting*. Champlain, Illinois, U.S.A. Volume 25, Number 2. 1990.
- ROSS, A.S. et al. *Princípios de Administração Financeira. (Essentials of Corporate Finance)*. Translation by Antonio Zoratto Sanvicente. São Paulo: Atlas, 1998.
- RIBEIRO, M.S. and SANTOS, A. *Avaliação das distribuidoras de energia elétrica a partir da DVA*. Annals of the 3rd Brazilian Financial Meeting, organized by the Sociedade Brasileira de Finanças. CD-ROM, São Paulo, 2003.
- RIBEIRO, Maisa de S.. *Custeio das Atividade de Natureza Ambiental*. Doctoral thesis. Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo - FEA/USP. São Paulo, 1998.
- SANTOS, A. dos. *Demonstração do Valor Adicionado: como elaborar e analisar a DVA*.. São Paulo: Atlas. 2003.
- \_\_\_\_\_. *Demonstração contábil do valor adicionado – DVA. Um instrumento para medição da geração e distribuição de riqueza das empresas*. Professorship thesis. FEA. São Paulo. 1999.
- \_\_\_\_\_; HASHIMOTO, Hugo. Demonstração de valor adicionado: algumas considerações sobre a carga tributária. *Rausp – Revista de Administração da USP*. pp. 153-164, 2003.