

# **The New Structure Of The Gas Industry In The State Of São Paulo**

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## **ABSTRACT**

The rapidly increasing availability of natural gas is leading to a significant increase in the importance of the gas industry in Brazil. This new era is already causing major changes in the existing gas distribution companies. Gas distribution concessions are a natural monopoly and the growth in demand for this energy source will require that these growing concessions are regulated.

The south/south-east of Brazil is the centre of the country's industrial base and the State of São Paulo is where most of the manufacturing activity is located. In addition, natural gas from Bolivia is scheduled to arrive in the State of São Paulo at the end of 1998. These two facts combined will mean major changes in the operations of manufacturing industry and in the gas supply business.

Comparing the experience faced by other countries where a competitive environment in the gas industry has been introduced with privatisation programmes and the dismantlement of monopolies, this paper attempts to look in to the future of the natural gas industry in the State of São Paulo in respect to the possible regulation that might be applicable, focusing on the the new regulatory framework proposed to the gas industry sector and the perspectives for the introduction of the competition in gas industry in the State of São Paulo.

## **Introduction**

Because of the National Privatization Programme - PND<sup>1</sup>, aiming at the transferring public services activities from the Government to private sector, the Brazilian Government has changed its role from *owner* to *promoter* and *regulator* of the social and economical development of the country.

Although in the developed countries the main driver for reform of the infrastructure services is the technological progress (Fritschak 1995) as well as the revaluation of the activities with characteristics of natural monopoly, the Brazilian infrastructure reform is much more related to the financial crisis which hampers the government investments in infrastructure.

In the energy sector the deep crisis faced by the power and gas utilities lead the Secretariat of Energy of the State of São Paulo to develop programmes to improve the performance of public services. Besides reducing the public expenses and the debt of the state owned energy companies of São Paulo, the Secretariat of Energy of São Paulo promoted a strong and strategic change in the established structure of the energy companies to attract private capital to potentially competitive sectors, including energy generation and distribution.

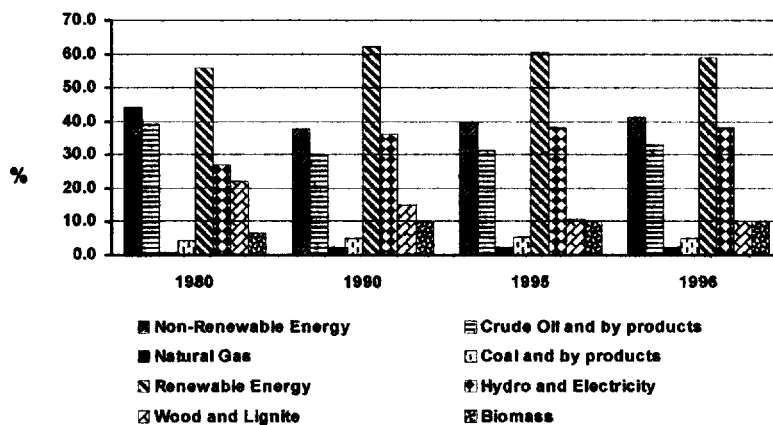
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<sup>1</sup> Programa Nacional de Desestatização

The government of São Paulo developed the State Privatization Programme - PED<sup>2</sup>, which covers the reform of all energy companies in the State of São Paulo, including the Companhia de Gás de São Paulo – COMGÁS, the gas utility of São Paulo, as a legal and institutional support to allow the participation of foreign investment in the energy sector.

## Energy in Brazil

Natural gas industry still plays a minor role in terms of final energy consumption, number of consumers and volume of gas sold. The supply of energy from indigenous sources in Brazil (MME 1997) shows a relatively significant renewable energy, the majority represented by hydro 38.3% and biomass 19.8% (10.2% bagasse of sugar cane and 9.6% wood). The fossil fuels represent about 5.2% (Figure 1). The share of natural gas in the final energy consumption is insignificant – 2.5%, mainly as compared with other countries such as Argentina, Venezuela, Italy and United Kingdom.



**Figure 1 – Brazilian Energy Matrix**

This situation is explained by the fact that proven natural gas reserves are tiny and during the last decades Brazil have invested heavily in the drilling and exploration of crude oil reserves and in the development of the potential of hydro.

These investments allowed Brazil to develop its renewable sources of energy and to mitigate the dependence on imported fuel. However, economically feasible resources have already been explored, and the remaining ones are expensive to develop due to the long distance from the production fields to the centers of consumption and to the environmental costs associated to them.

<sup>2</sup> Programa Estadual de Desestatização, Law 9361 – July 5, 1996

The present energy policy of Brazilian government gives to natural gas an important role to natural gas in the future – the goal is the achievement of 12% gas share of the total primary energy by the year 2010 – taking into account benefits in terms of the environment improvement and energy-efficiency gains if compared with sulphur fuel oil, wood and coal. This change would improve the profile of the Brazilian energy matrix through higher flexibility and diversity of the resources, following the trends of other countries where natural gas is used more widely.

## The Institutional Framework of the Gas Industry in Brazil

Law 2004 of 1953 granted rights to Petrobrás<sup>3</sup> to explore the oil and gas related activities – exploration, production, transportation and distribution. Before 1988, when the Brazilian Federal Constitution became effective, conflicting interpretations regarding to the granting power of gas distribution utilities created a climate of unrest that halted the development of the sector.

As a result, Petrobrás investments in exploration, production and transportation of natural gas were marginal during the ten years that precedes the adoption of this Constitution. Petrobrás itself directly supplied gas to large industries in the Northeastern states and in Rio de Janeiro, hampering not only the implementation of a handful of new gas utilities but also the expansion of the two existing and major operating gas distribution companies – The Companhia Estadual de Gás (CEG) in Rio de Janeiro and the Companhia de Gás de São Paulo (COMGÁS).

With the advent of the new Federal Constitution in 1988 which defined gas distribution activities as State concessions rather than Federal ones, the outlook for the gas sector changed. The Brazilian states lacked funding to invest in their gas distribution utilities and Petrobrás needed to transfer its distribution networks to the state-owned companies. A significant amount of creativity was required to develop a corporate model that would be capable of keeping the stockholding control in the hands of the State's Government and allowing an effective participation of Petrobrás and private companies in the management of a gas distribution utility. Up to 1988, there were only 3 state owned gas distribution utilities in Brazil (CEG, COMGÁS and CEMIG<sup>4</sup>). Nowadays there are 17, 13 of which are operating and 4 are awaiting to sign their supply agreements (Figure 2).

■ SHARE IN PRIMARY ENERGY CONSUMPTION	2.5%
■ NUMBER OF CONSUMERS	841,000
■ GAS TO STATE CONCESSIONAIRES	10.0 MM m <sup>3</sup> /day
■ DISTRIBUTION NETWORK	4,372 km
■ NUMBER OF GAS UTILITIES	17
• IN OPERATION	13
• SOON TO START OPERATION	4
■ NATURAL GAS PRODUCTION	28.2 MMm <sup>3</sup> /day
■ PROVED RESERVES	157.7 billions m <sup>3</sup>
■ RESERVES/PRODUCTION	17 years
■ GAS PIPELINES	3,962 km

**Figure 2 – Gas Industry Indicators in Brazil (1996)**

<sup>3</sup> the national brazilian company that explores, produces, transports, exports, imports and distributes oil and gas

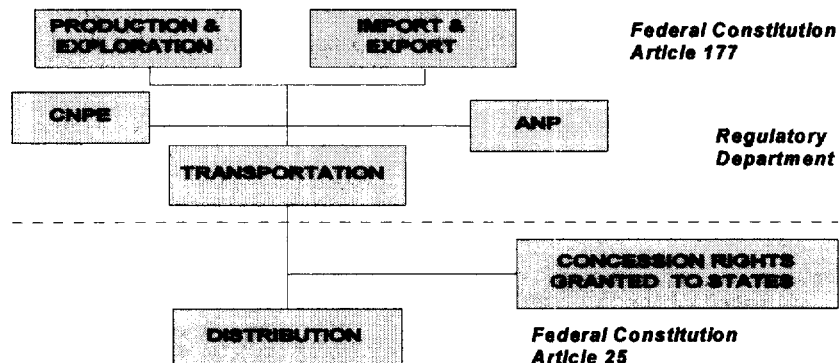
<sup>4</sup> Companhia Energética de Minas Gerais

A joint management scheme of a gas distribution utility by the State's Government, Petrobrás<sup>5</sup> and private companies was achieved through a model in which Bylaws and Shareholder Agreements assured that representatives of those companies would take part in the management of a gas utility and established that all important management decisions had to be submitted and approved by consensus or by a specific number of votes that would require the State to cooperate with at least one stockholder to achieve.

Later on, the approval of the Federal Constitution Amendment 9 of 1995 brought a new perspective for the oil and gas industry in Brasil, because it allowed the dismantlement of the legal monopoly framework established by the Law 2,004 of 1953.

The Law 9,478 of 1997 created two Federal Organisms – The Agência Nacional do Petróleo – ANP and the Conselho Nacional de Política Energética -- CNPE. The ANP is the national regulatory agency, responsible for regulating, bidding and licensing oil and gas industry activities. The CNPE is in charge of proposing national energy policies, promoting the efficient use of energy resources, ensuring the diversification of energy resources, reviewing energy matrix, setting guidelines to promote the use of oil and natural gas and the export and import of fuels.

Considering the Constitution Amendment 5 of 1995 – which removed the state-owned gas utilities exclusivity in distributing gas and the Law 9,478 of 1997 - a new configuration of gas industry in Brazil was established.(Figure 3).



**Figure 3- Gas Chain in Brazil**

The Table 1 shows that the upstream activities of gas industry is controlled and regulated at Federal level while the downstream activities are under control of the States. The new legislation attributes to each State the responsibility for developing a particular legislation to explore downstream activities as well as the development of a regulatory organization to fund these activities.

<sup>5</sup> Petrobrás is involved in the oil and gas distribution activities through its subsidiary Petrobrás Distribuidora-BR

**Table 1 - Status of The Institutional Framework of Gas Industry in Brazil**

Activities	Competence	Regulatory Organization	Status of Competition
Exploration/Production	Government Monopoly	ANP/concession contract (bidding)	Transition from monopoly to competition
Import/Export	Government Monopoly	ANP/authorization	Transition from monopoly to competition
Transportation	Government Monopoly	ANP/authorization	Natural monopoly
Distribution	State	Public Service Commission /concession contract (bidding)	Transition from monopoly to competition

The innovative changes occurred in the institutional status of the gas industry in Brazil because it changed the organization of the oil and gas as well as the structure of the market, dismantling the monopoly in upstream and downstream activities and opening them to competition.

## The Gas Industry in São Paulo

The distribution of piped natural gas in the State of São Paulo is carried out by only one gas distribution utility – COMGÁS. It was founded by English operators in the last century as a piped gas distributor for street lighting purposes. This type of lighting was used until the 30's, when coke gas was substituted in favour of electricity. With the process of urbanisation and industrialisation faced by the State of São Paulo in the 1970's, COMGÁS started distributing manufactured gas produced by reforming of naphtha feedstock. São Paulo City Town Hall was COMGÁS' major shareholder until 1984, when its control was transferred to The State of São Paulo.

With the guidelines of Federal Constitution of 1988, granting the States the gas distribution services, COMGÁS took the responsibility to supply gas throughout the State of São Paulo. In 1989, COMGÁS started distributing natural gas from Bacia de Campos, Rio de Janeiro, to large industries in the São Paulo Metropolitan Region. In June 1991, following the directives of the São Paulo Natural Gas Distribution Project<sup>6</sup> the extension of COMGÁS distribution system and the conversion of appliances brought a new perspective for the growth of the gas share of energy scenario of São Paulo.

The conversion programme allowed all network and appliances to be converted from manufactured gas to natural gas and the consumption of natural gas in the domestic sector to be increased. Given the strong industrial demand, COMGÁS expanded its service area to neighbouring cities, including São José dos Campos, in the Vale do Paraíba and Cubatão, with gas supplied from the Bacia de Santos (Figura 4).

## Concession Area and Gas Market

<sup>6</sup> Financed by the International Bank for Reconstruction and Development - BIRD

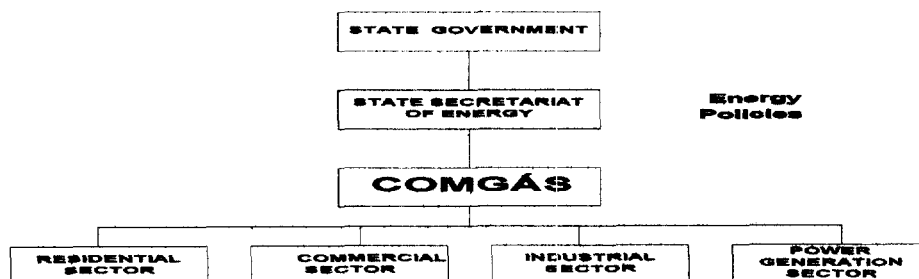
While the residential/commercial sector represents the most profitable niche for the gas, this sector's consumption and growth potential is limited by the high investments required to increase the client base. The current number of residential and commercial consumers mentioned above shows a small penetration rate when compared to the number of households in the concession area.

The state of São Paulo alone has more than 2 million households. COMGÁS is currently investing to expand average consumption per household. It is expected that after privatisation, investment in this segment will be much more aggressive, despite the use of LPG which is more common in residential use.

In the transport side, natural gas use is mandatory for buses in the city of São Paulo since the combustion of natural gas does not emit sulphur and oxide residues<sup>7</sup>. In 1997, about 2,700 taxis and 137 buses were fueled by natural gas in the city of São Paulo out of a total of 11,000 buses, 45,000 taxis and 4.5 million cars.

During the winter months, car owners are subject to a mandatory rotation scheme under which 20% of privately owned vehicles are prohibited from entering the city during week days. Cars using natural gas as their fuel source are not required to participate in this scheme. This benefit is complemented by the lower operating cost per mile of natural gas vehicles.

Despite the existing contract, the State may limit COMGÁS' concession territory to the area in which COMGÁS currently operates. The State privatisation programme stipulates that the State can be divided into a maximum of three areas. These new areas could be auctioned off separately (Figure 6 and Figure 7).



**Figura 6 - Present Structure of the Gas Sector in the State of São Paulo**

At present, COMGÁS is investing in order to increase its presence in the rest of the State, possibly in an effort to avoid losing concession territory.

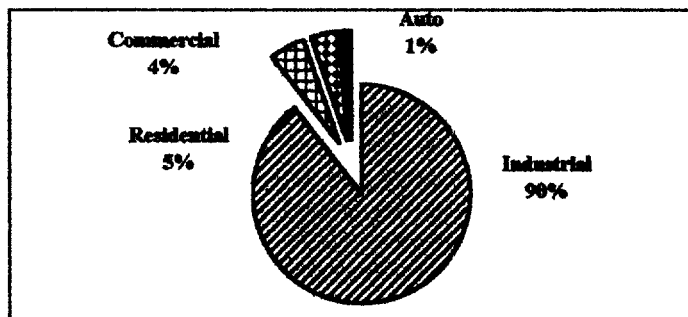
<sup>7</sup> The Municipal Law 12,140 of 1996 states that bus fleet of the city of São Paulo should be converted from diesel fuel to natural gas

COMGÁS currently operates in the São Paulo Metropolitan area and industrial district (including 14 municipalities), the Baixada Santista (including Santos and Cubatão) and the Vale do Paraíba (including São José dos Campos). The bulk of the State's industrial activity is concentrated in these areas. On 12 December 1996, COMGÁS and the State of São Paulo signed a 30-year concession contract granting the former exclusive rights to the distribution of piped gas, encompassing the entire state territory.

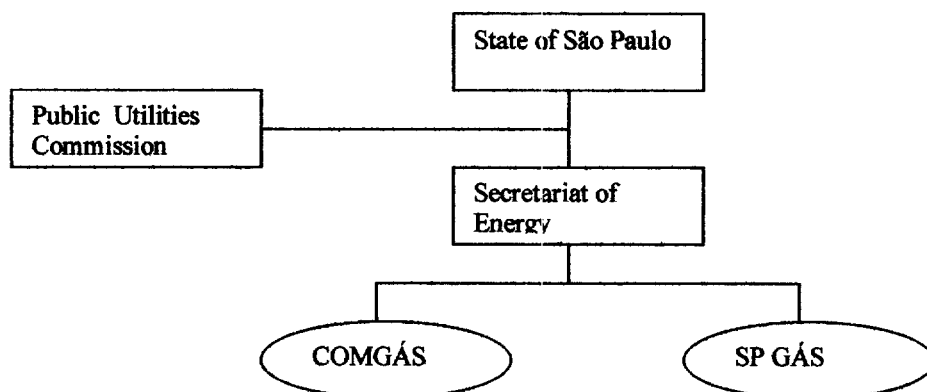


**Figure 4 – Area of São Paulo Covered by COMGÁS**

The state of São Paulo accounts for 22% of the Brazilian population and is responsible for 35.7% of the country's GDP. COMGÁS services cities representing 56.7% of the State's population and 66% of its local income. In December of 1997 (COMGÁS 1997), total gas volume sold came to 1,232 million m<sup>3</sup> (3.5 million m<sup>3</sup>/day) to around 288,773 clients, servicing the residential, commercial, industrial and automotive sectors (Figure 5). The average number of customers is broken as 480 industrial, 281,357 residential and 6,918 commercial.



**Figure 5 – Gas Volume Sales (1997)**



**Figure 7 – Possible Overview of Gas Concessions**

By year 2000 the demand for gas is expected to increase by 13,400 thousand m<sup>3</sup>/day, with the industrial sector accounting for 80% of the estimated demand. This shows the large potential of growth in the industrial sector where natural gas competes with fuel oil. In the residential, commercial and auto sectors, the trends are a small penetration of natural gas, representing 20% of the total estimated demand (Table 2).

**Table 2 –Natural Gas Potential Demand Estimated for Year 2000**

Area	Gas Sectors (thousand m <sup>3</sup> /day)			
	Industrial	Residential/Commercial/ Auto	Total	%
Actual covered area	8,177	2,590	10,767	79
Expansion area	2,768	109	2,877	21
Total	10,945	2,699	13,644	100

## Bolivia-Brazil Gas Pipeline Project

On 25 July 1997, the Brazilian and Bolivian governments signed a US\$ 2 billion contract to build a gas pipeline connecting the two countries. The pipeline will stretch approximately 3,150 km, of which 2,593 km will be on Brazilian soil. The first stage of the project, connecting Santa Cruz de La Sierra to São Paulo, should start in December 1998.

Those industrial sector gas demand figures shown in Table 3 were essential for the feasibility studies of the Bolivia-Brazil gas pipeline project as it shows existing long term consumption level able to guarantee the development of such a project, which interconnects natural gas reserves to non-mature gas markets. The initial production forecast for this first stage is 9 million m<sup>3</sup>/day, 45% of which will be allocated to the State of São Paulo. The original contract stipulates that, by the year 2006, Bolivia will be supplying 18 million m<sup>3</sup>/day, of which 8 million m<sup>3</sup>/day will be directed to COMGÁS.

The Bolivian gas will guarantee the continuity of supply to the present São Paulo consumers as well as to the potential ones - covering about 49 municipalities - demanding US\$ 320 million in investments to the expansion of the gas network. The great majority of the investment will be in the North and Northwest areas of the State of São Paulo (51%), where the bulk of the heavy industries and



commerce are concentrated, which represent interesting rate of economic growth as well as introducing advantage for natural gas if compared with the other competing fuels.

## **The Institutional Reform of Gas Sector in the State of São Paulo – Comparison with other Countries**

In October 1997 the Comissão de Serviços Públicos de Energia - CSPE, linked to the Secretariat of Energy of São Paulo was created. The CSPE monitors the quality of the energy public services in the State of São Paulo as well as regulating the tariffs and requirements to service customers. Partnership contracts are encourage between existing regulatory organizations at Federal, State and Municipal levels so that regulatory commissions could develop interrelated their activities. The main CSPE goals are:

- To prohibit the discrimination in use and access to energy;
- To protect the consumers in relation to price, guarantee of supply and quality of supply;
- To establish tools and promote fair tariffs to consumers;
- To provide data on the services supplied by the energy utilities; and
- To publish data on public services and criteria to the establishment of public tariffs.

In the case of São Paulo, the choice for an regulatory organization which deals with the energy sector as a whole is explained by the relevant share of the power generation sector in the State (40%)<sup>8</sup>. In Rio de Janeiro State, the second gas market in Brazil, a multi service regulatory agency was created, dealing with water, electricity transport and gas. This type of regulatory organization of public services is very much similar to that in USA, where the gas sector is regulated at two levels – at the State level by the Public Utility Commissions which controls the price policies of the gas utilities and at the Federal level by the Federal Energy Regulatory Commission – FERC - which controls the transport and interstate trade.

The FERC regulated the construction of pipelines, the well-head prices and the price of the gas sold from the transport companies to gas distributing utilities for about 40 years (Jacques 1997). As the majority of the North American gas distribution utilities are private ones, with the Government taking a lead in promoting the industry and ensuring that the legislation in place is maintained. Because of this, the structure of North American regulatory agencies are in general formed by hundreds of employees to control services with a high level of detail.

In other countries, such as Argentina and United Kingdom, the regulation of the gas industry is ruled by specific agencies dealing with gas – the Ente Nacional Regulador del Gas (ENARGAS) and the Office of Gas Supply (Ofgas), respectively. These agencies were created to support the privatization of the national gas utilities of those countries.

In the United Kingdom, the dismantlement of the monopoly of the power and gas sector occurred in the 1980's and was aimed at the promotion of the competition. The English regulatory

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<sup>8</sup> Other states in Brazil are adopting multi services regulatory agencies

agencies are less bureaucratic if compared to the American version as the gas distribution utilities are controlled more indirectly.

In the South America, regulation of the energy sectors occurred more strongly in Argentina and Chile. In Chile, the establishment of a regulatory framework in the 1980's happened before the reform of the privatization of the energy companies and the changes have been introduced gradually, which may explain one of the reasons of the success of Chilean reform. In Argentina, a deficit of energy caused the Government to restructure the power and gas sector before a regulatory framework was established. Because of this, Argentina faced some operational drawbacks, as compared with Chile.

Information from countries with mature gas industries - where gas use and institutional structures are already in place - will help the Brazilian Government learn from the satisfactory and unsatisfactory situations emerging in this new scenario experienced by the State of São Paulo.

The regulatory energy agency in the State of São Paulo – the CSPE – has the challenge to prove that is able to promote the economic efficiency and a market oriented policy for the gas industry in the long term period. Moreover, state legislation for energy needs to cover all the different energy markets and different regulatory regimes are needed for each market. At the present, the guidelines and direction of the CSPE indicates a standard approach for dealing with different types of energy .

As a reference, the situation experienced by United Kingdom with the establishment of its gas regulation office is particularly interesting, demonstrating that it is difficult to promote market competition when there is a particular regulation dealing with different activities – such as water, oil and gas. Market competition in the State of São Paulo will find similar barriers, in part because the gas network is small and very dependent upon new investment. The complex features of the energy sector in Brazil and consequently in São Paulo as compared with U.K as well as the territorial size, the number of consumers and diversity of supply sources of the English gas pipelines make the simple adoption of the English model difficult.

The Secretariat of Energy is proposing a transition period of 10 years to promote competition in gas market, considering that this is the period needed to recover all the investments made in network and infrastructure. During this period, the competition is liable to happen, though not compulsory by law, and the regulatory office would establish a internal rate of return on investments carried out by gas distribution utilities. From the tenth year on, the competition would be compulsory by law and would depend solely of the social and economic situation of the market. From The Secretariat of Energy's point of view, two topics are suggested to help promote competitiveness:

- Provide open access to transportation of gas through utility owned gas pipelines–inclusion of wheeling with clear and fair tariffs; and
- Separate transportation, storage and gas trading, in order to promote potential competition amongst gas traders and to facilitate the allocation of resources in terms of costs.

The international experience of countries with mature gas industries, such as USA, United Kingdom and Argentina, demonstrates that the competition occurred once the gas utilities had infrastructure and pipes already in place and investment paid back.

As an example, the post World War II development of natural gas transmission systems in North America and Europe has been regulated by both financial institutions and governments on the basis of long-term supply contracts to mitigate the risk associated with very costly and highly specific assets (Vollans 1995). In particular, firm contracts with take or pay provisions both upstream and downstream provided assurance that the facilities would be used and paid for. Now that the system in North America is largely in place – and the initial debt retired – expansion has become more incremental through looping of existing lines and additional compression, while the trade functions that pipelines once played has been virtually eliminated.

## **Recommendations**

This report sets out to examine considerations in the natural gas industry in Brazil and in the State of São Paulo and concentrates mainly on a critical analysis of the transformation faced by its oil and gas industry, comparing Brazilian status with those of some countries.

The establishment of a national oil agency shows that considerable progress is being made. The Government should devote more attention and go further in a more comprehensive study in the regulation field. Substantial progress towards this can be made on a basis of the fundamental knowledge and operational experience now available from the experience of foreign countries where of energy sector monopolies were dismantled and the competition was gradually introduced.

With respect the Legislation, gas standards and specific legislation have not kept pace with the economic growth of Brazil. Comparing international legislation concerned with gas business, detailed rules for all actors involved in the gas chain as well as standards and codes of practice are needed for well defined regulation to be achieved.

The establishment of a specific legislation for gas, standards and codes of practice goes beyond the the government and involves the gas distribution utilities and the consumer himself. This framework is well defined, where government sets essential general rules for all actors involved, followed by the gas distribution utilities which in turn develop detailed standards based on them and the society gathers together giving inputs for the improvement of standards. This typical characteristic of mature markets was achieved by years of experience . The emerging natural gas market in Brazil and São Paulo demands clear gas legislation is established.

Finally, the gas industry in Brazil needs to develop to such an extent that it would be able to:

- Compete with foreign similar products all over the world;
- Improve its productivity;
- Improve the quality of Brazilian-made products;
- Enhance the environment, specially in large urban and/or industrial concentrations;
- Improve Brazilian energy efficiency;
- Introduce Brazilian products in the expanding world market for gas equipment and domestic appliances;
- Increase and achieve adequate integration with other Latin American and African countries; and

- Increase employment opportunities through the construction of the required infrastructure.

A large distribution network and the development of detailed gas legislation is required before this can be achieved. As far as Brazil is concerned, natural gas represents an important mean of developing its foreign trade and integrating the southern hemisphere. Brazil is surrounded by countries with large reserves of this energy source that could trade their gas for Brazilian manufactured goods, and help reduce Brazilian dependence on Middle East oil suppliers. These countries are Argentina, Bolivia, Peru, Venezuela and possibly Trinidad-Tobago.

Thus, although there is a crucial need to develop the gas industry in Brazil, such undertaking would have to be properly structured, and legal and regulatory mechanisms are needed that would allow and encourage greater cooperation from the private sector.

Consistent Legislation is impossible to be achieved in this initial phase of reform faced by Brazilian. However, considerable progress can be made. In assessing international experience, the success and drawbacks have to be balanced against other factors, such as societal, economical, political and others. Besides the establishment of a well defined and clear legislation, better performance of the sector can be achieved by greater expenditure in training and in customer awareness. Brazil as a whole and São Paulo in particular has now reached a stage of development when it is necessary for the Government to take the initiative in laying down more detailed regulation concerned to gas industry and standards to internationally acceptable levels.

Reform of the sector cannot be achieved overnight and must be balanced against available resources and other priorities, but with the use of good sense, commitment and effort this can be successfully done.

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