Case Study:

BRAZIL

PROJECT:

Regulatory Frameworks and The Role Of State–Owned Oil & Gas Companies

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EXECUTIVE SUMMARY

The nineties' restructuring of the Brazilian public sector followed the world–wide reform movement and adopted, as its primary measures, a program of privatization, economic openness, market liberalization, the so–called competition policies, and legal reforms, following the Constitutional amendments of 1988.

Particularly in the oil and natural gas sector, these institutional changes sought to introduce competitive pressures in segments where competition was possible. Selection of the openness model for the oil and natural gas sector was marked by gradualism in structural and institutional change and by a deliberate political choice to preserve the role of the State–owned Petrobras as the company to lead and control the sector.

Goals of the New Regulatory Framework

In sector terms, the government's purpose in reforming Brazil's oil & gas industry was to introduce competitive pressures by encouraging the entrance of private agents, and to form partnerships between the State–owned Petrobras and present or potential domestic and/or foreign agents entering the domestic market structure.

Brazil's oil & gas industry reform began formally in 1995 and was related to the Brazilian State Reform implemented during the administration of Fernando Henrique Cardoso. Continuing in this line, Constitutional Amendment No. 9 of 1995 legally broke up the Petrobras monopoly, exercised since 1953, over oil and natural gas exploration and development, oil refining, foreign trade of petroleum products, and transportation of oil, petroleum derivatives, and natural gas.

Law No. 9478 of 1997 created the *Agência Nacional do Petróleo, Gás Natural e Biocombustíveis* (ANP), which aims to *"foster the regulation, contracting and inspection of all economic activities making up the oil industry (Art. 8).*

The ANP, a governmental regulatory entity, is responsible for issuing calls to bid on oil and natural gas exploration, development and production concessions, sign contracts with awardees and supervise their execution.

Created as a special autarchy under the *Ministério de Minas e Energia* (MME), this agency had the responsibility to regulate the actions of all operators, including Petrobras, in the Brazilian oil and natural gas market, in keeping with the provisions of the 1995 Constitutional Amendment that withdrew said State–owned company's power to execute the monopoly.

Formally, the ANP also enjoyed financial and managerial autonomy, being headed by a director general and four additional directors, named for four–year renewable terms.

Designations for directors' positions are made by recommendation of the MME and the President of the Republic. Upon indication, the directors are examined by the *Comissão de Infrastructure do Senado*. Once approved by this Commission, the name of the aspiring director has to be approved by the plenary of the Senate.

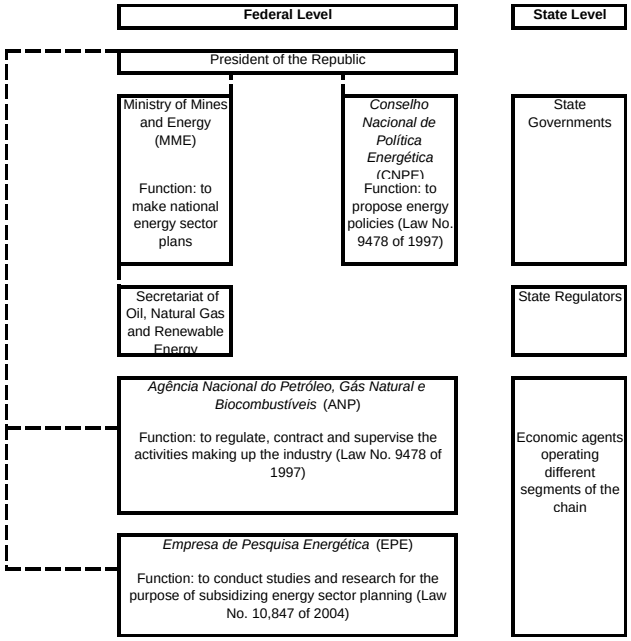
To date, indications have always reflected political choices, although in many cases since the creation of the agencies, directors have had background and experience in the energy field, nominations have reflected the structure of power distribution among the different political parties, in an attempt to establish a coalition to ensure a majority in Congress and the conditions needed for governance.

The same phenomenon is seen within State–owned companies, whose managerial positions are a stage for heated disputes among the parties that support the regime. Meanwhile, in the particular case of Petrobras, some of the managerial positions always end up being held by permanent staff in the company, although this type of designation also reflects a political selection by this or that party.

It is noteworthy that, as in the other regulatory agencies, the ANP has both licensing power regulatory duties. The scope of the same law created the *Conselho Nacional de Política Energética* (CNPE), entrusted with promoting the rational use of energy resources, ensuring their supply throughout the national territory, reviewing regional energy matrices, and developing guidelines for specific programs and for oil & gas import / export.

Both the CNPE and the ANP are part of an energy policy and regulatory organization for the Brazilian oil & gas industry (Figure 1) that includes the federal government and the States of the federation. The *Ministério de Minas e Energia* (MME) is charged with developing energy policy directives, which are validated or contested in the CNPE. Within the ministerial structure, these tasks are carried out by the *Secretaria de Petróleo, Natural gas e Energias Renováveis*. Although the State regulatory agencies have a multi–sector scope and regulate other infrastructure sectors, they are specifically for regulating gas distribution activities. This setup is formally completed through the functions performed by the newly–created (2004) *Empresa de Pesquisa Energética* (EPE) – the MME branch responsible for the studies in support of energy planning, although there is no formal document summarizing the orientation of national energy policies.

Figure 1 – Institutional Layout of Brazil's Oil & Gas Industry



Being regulations for a non–renewable natural resource industry, the goal in introducing competitive pressures and attracting private capital were in keeping with Federal control of ownership rights over oil and natural gas reserves.

Results of Opening the Brazilian Oil & Gas Industry

Despite the vast array of missions, it is an undeniable fact that the ANP's activities have been centred on organizing the entry process for new companies in the up–stream segment. Through the device of auctioning exploratory blocks, the liberalization process went very well during the 1999–2005 period. Over 500 exploratory blocks were granted during the first seven (7) rounds carried out by the ANP.

The main results of these auctions served to confirm Petrobras' leadership and completed most of the offers of blocks, based on geological experience with Brazil's sedimentary basins. The auctions were considered a success by reason of the number of interested participants and the variety of bonds signed. The revenues from the government's participation in the seven Bidding Rounds,[1] completed between 1999 and 2005, reached a total of R$ 3.26 billion.

Despite this increase in the number of operators, Petrobras remained the major company in the sector and the primary awardee of all competitive bidding rounds. The need to share the risks and, above all, the technological competencies required for exploratory efforts in *off–shore* border areas, are factors that drove

[1] The eighth round, held in November 2006, was suspended by a judicial decision before works were completed.

cooperation strategies between the international companies and Petrobras in restructuring the Brazilian up–stream. These strategies were characterized by the entry of major global petroleum groups and the internationalization of Brazil's up–stream sector.

As for the down–stream segment, it is noteworthy that Brazil's refining capacity is structured around 14 plants, including a schist processing unit and a lubricant factory. The nominal capacity is nearly 2 million barrels per day, and Petrobras produces 98 % of that total. Therefore, the process of opening Brazil's oil & gas industry had no effect on the market structure of this business sector.

With regard to petroleum product distribution, in contrast with other countries that organized their oil industries in a vertical, monopolistic way, this segment was always shared by several private foreign and domestic companies, thus constituting a competitive oligopoly in which Shell, Esso, Texaco, Ipiranga, Atlantic, and others have stood out. It is important to note that Petrobras actually entered this link of the oil chain belatedly, as the subsidiary *BR Distributor* was only established in 1971, seventeen years after Petrobras was created.

The new regulatory model for Brazil's down–stream sector, regulated by the ANP, aims to increase the number of derivative supply alternatives on the domestic market, thus enabling competition among suppliers. With this purpose in mind, the new model seeks to diversify the economic agents acting on the market, and today, in addition to the large foreign companies, the derivatives distribution segment includes nearly 200 small to medium–size companies.

These changes require reinforcing the ANP's competencies for inspection and regulation of the sector and particularly of marketed fuel quality.

Also in the natural gas industry, the primary regulatory frameworks are Law No. 9,478 of 97 and the Federal Constitution. However, this legal framework was inadequate to deal with the primary regulatory issues in the gas industry, especially its interface with the electric sector due to the growing share of gas–powered thermoelectric generation. Furthermore, there is still much uncertainty as to the line separating Federal (transportation) and State (distribution) regulatory responsibility.

At October 2007, Congress had not approved the specific bill, which is currently before parliament, meant to define a new legal framework and regulatory structure for the gas industry.

Sector Performance and Dominant Position of Petrobras

The opening process produced extremely positive results for Petrobras, aided by the growing domestic market and high oil prices, as well as the company's vertical type structure. The latter, along with the barriers to enter the refining industry and the incipient development of new production fields, explains the fact that foreign countries present in Brazil's oil & gas industry have still hot achieved comparative results.

Petrobras is a mixed (public–private), open capital stock company that is controlled by the Federal Government (51 %), which acts in a vertically integrated way at all stages of the oil chain. Company stock is negotiated on the Brazilian market and in other international financial markets, such as the USA.

This classification as a mixed company favoured Petrobras' exemption from the criteria for recruiting services under Law No. 8,666 of 1993, which requires competitive public bidding contests for all contracting of goods and services in the Brazilian public sector. Therefore, Petrobras enjoys great autonomy in its managerial decisions, but is still accountable to the *Tribunal de Contas da União* (Federal accounts court), which is responsible for the external control of Brazil's public agencies and state–owned companies. The company has nearly 48 thousand competitively–selected officers (approved by public examination of their professional background).

Petrobras plays a role as "*national champion*" of the Brazilian economy. The company specializes in the following segments of the oil, gas and energy industry: exploration and production, refining, marketing, transportation, petrochemical, and products distribution.

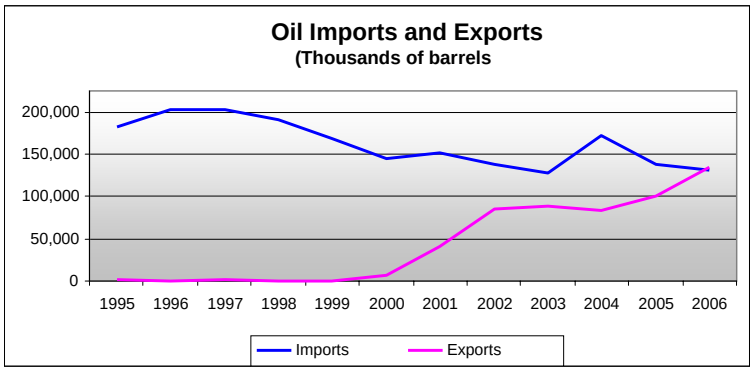
Following the reform of Brazil's oil & gas industry, despite the entry of new players, Petrobras still holds the dominant position. As mentioned above, this State–owned company is the "great victor" of the competitive bidding rounds and is responsible for practically all petroleum production in the country. In distribution, the subsidiary company *BR Distributor* is the leader of the segment, but it competes for slices of the market with other distributors.

With regard to natural gas, Petrobras is currently responsible for nearly 96 % of all domestic production and 90 % of all gas imports. In addition, it holds practically all internal transportation infrastructure. With regard to distribution, Petrobras holds shares in 20 of the 26 State piped gas distribution companies. On the demand side, it participates in many projects to build thermoelectric and cogeneration plants.

This data reveals that the review of Petrobras' performance is fairly representative of the situation throughout Brazil's oil & gas industry, except for the products distribution segment.

As a result of Petrobras' exploration and production efforts and the resulting growth in production, Graph 1 shows the reduction of its dependency on foreign oil. This goal has been the common element of the Brazilian energy policy since oil was first struck in 1973, and has always been a priority of the different regimes that came into office in Brazil since then. Imports dropped 27 % between 1995 and 2006, from 182.5 to 131.9 million barrels. At the same time, a significant increase in exports was recorded for that period, leaping from 1.84 million barrels in 1995 to 134.34 million barrels in 2006.

Graph 1



Source: ANP

With regard to natural gas, the lack of transportation and distribution infrastructure gave this energy source a secondary role in comparison with the importance of oil in the Brazilian energy matrix.

However, although the natural gas industry is still incipient in Brazil, the share of gas in the energy matrix has been growing considerably. Between 1970 and 2006, the share of natural gas in the country's total primary energy supply went from nearly 2 % to approximately 10 %.

Table 1 shows Brazil's natural gas imports. One can see a significant increase in imports of that fuel between 1999 and 2005, jumping from 400 million m^3 to approximately 9 billion m^3, which is a direct result of the expansion of the domestic natural gas market.

Thus, <u>despite achieving self–sufficiency for oil, external dependency for natural gas continues to climb</u>. Import problems reoriented Petrobras' natural gas supply strategy towards launching an investment program to develop the infrastructure needed import Liquefied Natural Gas (LNG). Also of note is the *Plano Nacional de Antecipação de Gás*, implemented by Petrobras with a view to accelerating development programs for domestic production based on recent discoveries of new reserves, particularly in the *Campos, Santos*, and *Espírito Santo* basins.

Table 1 –Natural Gas Imports

	Imports Volume - MM m^3			Imports
	Argentina	**Bolívia**	**Total**	**US$/mil m^3**
1999	-	400	400	19
2000	106	2.105	2.211	184
2001	753	3.850	4.603	365
2002	492	4.777	5.269	425
2003	350	5.597	5.947	584
2004	451	7.635	8.086	785
2005	349	8.648	8.998	1.044

Source: ANP

Table 2 shows that Brazil was a net importer of petroleum products until recently, became a net exporter as of 2003, and so remained until 2006. This fact once again reflects a context of reduced foreign dependency for oil and petroleum products.

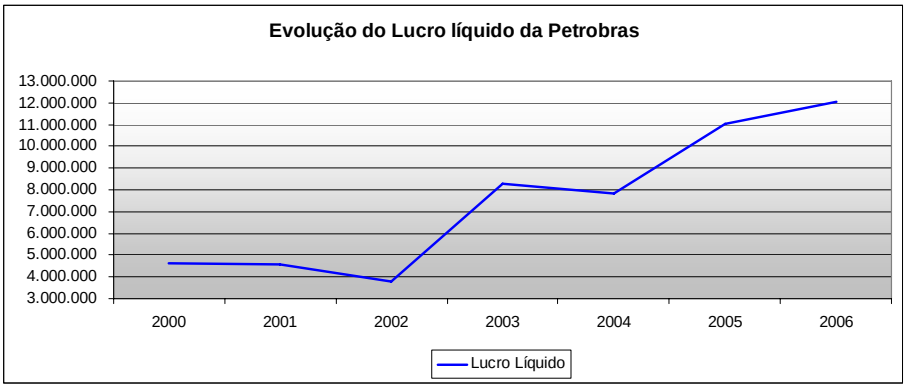
Table 2 – Imports and Exports of Petroleum Products

Year	Imports	Exports	X-M	Imports	Exports	X-M
	Mil m³		Mil m³	Mil US$ FOB		Mil US$ FOB
1996	16.118	3.763	(12.355)	2.135.630	494.772	(1.640.858)
1997	17.380	4.215	(13.166)	2.420.600	492.071	(1.928.529)
1998	17.555	6.538	(11.017)	1.695.571	548.349	(1.147.222)
1999	18.857	7.641	(11.215)	1.953.596	811.945	(1.141.651)
2000	18.229	7.878	(10.351)	3.225.564	1.854.038	(1.371.526)
2001	18.204	15.666	(2.538)	2.830.004	2.498.380	(331.624)
2002	16.780	15.013	(1.767)	2.389.564	2.271.585	(117.979)
2003	12.703	15.009	2.306	2.127.090	2.916.877	789.787
2004	11.139	15.796	4.657	2.494.948	3.447.635	952.687
2005	10.860	15.991	5.131	3.320.156	5.242.321	1.922.165
2006	13.414	16.775	3.361	4.923.972	6.411.745	1.487.773

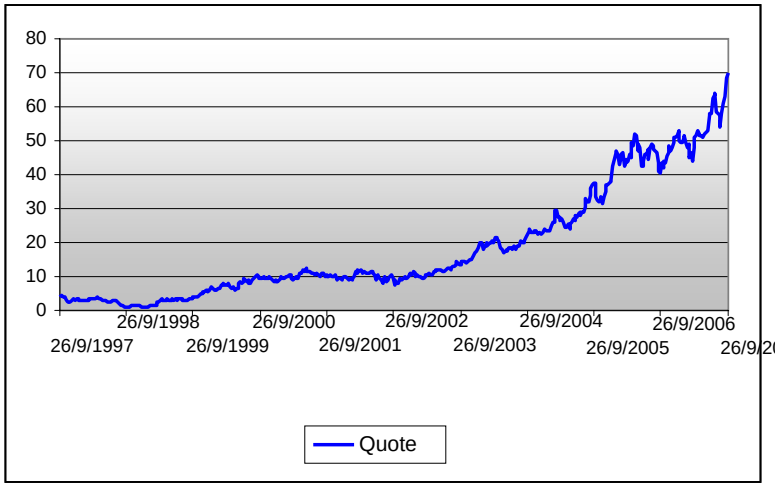
Source: ANP

Petrobras' business performance reveals great success following the opening, contrary to what some analysts foretold at the beginning of the reforms. Both receipts and net profits have grown as a result of the rise in production and oil prices (Graph 2). The magnitude of these figures reflects the vertical presence of Petrobras at all stages of the oil chain, which has not occurred with the other competitors. These results also help explain the speedy process of company internationalization. This increase in earnings has facilitated the search for company growth through seeking new exploration areas and purchasing the assets of smaller companies. Noteworthy also is the fact that these results reflect on the net worth of the company. Graph 3 shows the evolution of stock quotes over the past ten (10) years, just after Law No. 9,478 / 97 was passed. The nominal value of shares multiplied nearly eighteen (18) times over the figures seen in 1997. This has attracted the interest of corporate and individual investors, both within Brazil and abroad, which in the financial sphere has helped consolidate Petrobras as an important player in international markets.

Graph 2 – Petrobras Net Earnings (in thousands of US$)



Graph 3 – Evolution of the Value of Petrobras' Stock: 1997–2007



Lessons Learned and Recommendations

The process of opening up Brazil's oil & gas industry may be summarized by reviewing five lessons and guidelines.

First, the mechanism of auctioning oil blocks substantiated the opening process and enabled the entry of dozens of operators in oil exploration e production, with great transparency.

Second, Petrobras remains the major operating company in the country and the awardee of most auctions, acting alone or in partnership with other companies. Nevertheless, it is undeniable that a new business environment has been created that enables new oil companies to act in the up–stream segment of Brazil's oil & gas industry, especially to share technical know–how accumulated by Petrobras in offshore exploration in deep waters.

Third, one of the main problems remaining is that it may cause problems for the private companies discovering oil, due to the price policy and Petrobras' dominant position in the refining segment. Being the owner of practically 100 % of the refineries, Petrobras can act as a monopolist and monopsonist, thus hampering the activities of competing companies. In this way, liberalization did not cause the same effects in reducing the new companies' barriers to entry and participation in all of the economic activities of the oil chain. Brazil's *Sistema de Defesa da Concorrência* has proven incapable of dealing with this problem. It is undeniable that Petrobras' political weight in governmental decisions is a factor that explains the lack of objective decisions as concerns Brazil's oil & gas industry on behalf of the Brazilian pro–competition agencies. In this sense, it would be advisable to strengthen the duties and powers of competition promotion authorities on the

medium and long term, with a view to enabling or increasing competitive pressures in other segments.

Fourth, although the *Política Energética Nacional* is officially the responsibility of the *Ministério de Minas e Energia* and is ratified within the scope of the *Conselho Nacional de Política Energética*, the future of up–stream activities is still not clear. The central issue is regarding the decisions to be taken with regard to Petrobras' role in increasing national production. Will Brazil become an oil exporter? This matter is directly related to what criteria will dominate the offering of new oil blocks to be put up for bids over the next two years. Note that it would be advisable to make these criteria transparent, with a view to facilitating the investment decision making process and other private operating companies.

Fifth, with regard to the role of the ANP, we must say that during its first years of activity, the agency had several clashes with Petrobras in its attempt to implement the provisions of Law No. 9478 / 97, and was quite successful in organizing the entry process for new up–stream agents. The Brazilian model of competitive auctioning for oil blocks has become a referent for the international petroleum industry. However, over time the proactive activities of the ANP dropped off and the bidding process itself was heavily hit by last year's suspension of the eighth round. That event seriously affected the agency's credibility and placed a question mark on the improvement of the block auctioning model and on the next rounds.

Briefly, one could say that the reform of Brazil's oil & gas industry was successful in the up–stream sector, with transparent rules aimed to organize the entry process for new operators through the use of the competitive bidding mechanism for oil exploration blocks. The new "government take" structure greatly increased government revenues from the petroleum business for federal, state and municipal governments.

It is hard to foresee a change in this scenario on the medium term, since the Brazilian government placed its bets on gradualism in the liberalization process and on strengthening Petrobras, both on the domestic market and in the international arena.

Therefore, it is indisputable that the long–term evolution of Brazil's oil & gas industry will depend on the strategic moves of Petrobras. Accordingly, the initial motive of attracting private investment became a secondary objective in practice. Aside from giving new operators more room to act, the clearest outcome of the opening process was transforming the management and expanding the national and international assets portfolio of Petrobras. For now, there is no sign of change in this privileged status achieved by Petrobras following the Brazilian oil & gas industry reform.

1. INTRODUCTION

The nineties' restructuring of the Brazilian public sector followed the world–wide reform movement and adopted, as its primary measures, a program of privatization, economic openness, market liberalization, the so–called competition policies, and legal reforms, following the Constitutional amendments of 1988.

In general, the changes in Brazil's infrastructure and energy sectors involved the following activities: (i) de–verticalizing the production chain for energy infrastructure services; (ii) introducing competition in different activities of the network; (iii) opening access to third parties interested in sharing infrastructure; (iv) introducing new regulatory mechanisms; and (v) creating new forms of contracting.

Particularly in the oil and natural gas industries, these institutional changes sought to introduce competitive pressures in segments where competition was possible. Since then, the Federal State was seen to be acting as a regulatory agent in the industry. However, selection of the openness model for the oil and natural gas sector was marked by gradualism in structural and institutional change and by a deliberate decision to preserve the role of the State–owned Petrobras as the company to lead and control the sector.

This document examines the primary aspects of the reform the Brazilian oil & gas industry. Section 2 examines the main drivers of the reform and presents the new legal framework for the industry. Section 3 reviews the effects of liberalization on the up–stream sector, where the actual entry of new companies in exploration and production has been seen, since the introduction of the competitive oil block bidding mechanism. Section 4 highlights the impacts of the reform on the down–stream sector, especially the refining and distribution activities.

Section 5, in turn, shows that the new legal framework of the Brazilian oil & gas industry was found inadequate to regulate natural gas activities. Accordingly, on the one hand we examine the main scopes of the natural gas transportation regulations under the federal regulatory agency, the *Agência Nacional do Petróleo*. On the other hand, we also highlight the main regulatory gaps, with special emphasis on the divergent regulatory criteria in the gas distribution segment under the public regulatory agencies, and the problems that are inherent in the interface between the natural gas and electric industries, due to the expansion of thermoelectric generation. Section 6 traces a profile of the sector and business performance of the Brazilian oil & gas industry following the reforms, with the obvious prominence of Petrobras' dominant position. Finally, the last section focuses on the primary lessons learned and the problems remaining to be solved in the sector's regulatory environment.

2. BACKGROUND, FACTORS FAVOURING THE REFORM, AND NEW LEGAL FRAMEWORK

Briefly, one could say that the historical development of the world petroleum industry was channelled by two modalities of economic organization. The first, of American origin, was centred on the growth of private firms that evolved rapidly towards their internationalization. The second, whose precursors were England, Argentina and Mexico, was disseminated in most of the developing countries and centred on developing State–owned companies. However, the changes seen in the world energy and economic scenario after the oil shocks unleashed factors that altered the secular economic organization and redefined the horizons and strategic agendas of major players in the oil industry.

Similarly to what happened in economies that industrialized very late, the Brazilian petroleum sector entered this industry through a specific institutional solution of economic organization: the State monopoly (Law 2004, 1953).

From the creation of Petrobras in October 1953 to the promulgation of Constitutional Amendment No. 9 of November 09, 1995, a federal monopoly over oil and natural gas exploration and production was held exclusively by that company. Amendment No. 9 of 1995, which reformed article 177 of the Brazilian Constitution, allowed the participation of private companies in exploration and production activities.

From then until the oil reform of the second half of the 90's, the industry's successful growth curve, headed by Petrobras, had positioned the **Brazilian economy as one of the most expressive of rapid growth in the 20th Century. The success of that trajectory** projected the country as one of the most promising frontiers for the development of the world oil industry.

In sector terms, the government's purpose in reforming Brazil's oil & gas industry was to introduce competitive pressures by encouraging the entrance of private agents, and to form partnerships between the State–owned Petrobras and present or potential domestic and/or foreign agents entering the domestic market structure.

In a long–term conception, the reform sought three overall goals associated with economic efficiency in the productive, allocative and distributive dimensions.

The ***first***, with a sector focus despite the significant systemic implications for Brazil's economic performance, consists of the expected cost reductions in several segments of the domestic oil and natural gas industry (exploration / development / production, refining, transportation, distribution, and marketing).

The ***second*** goal set was to raise the level of investments in the oil industry, through a lowering of institutional barriers and the resulting increase in participation of new up–stream and down–stream operators.

Finally, the ***third*** goal was a substantial increase in fiscal revenue flows, caused by the expected expansion of the available tax base through the entry of new operators and the growth of national production.

As will be seen below, the new Brazilian oil act, Law No. 9478 of August 6, 1997, also known as the Oil Law, established gradual liberalization, combining federal title to ownership rights over oil & gas resources and Petrobras' status as a mixed (public / private) enterprise, with majority federal ownership, while preserving its vertical structure and its operational capacity. This Law ratified State ownership rights over production areas it was operating and over its holdings in refining, transportation and storage equipment and infrastructure. However, in keeping with the goal to create a new organizational pattern for the industry, it established free third–party access to State–owned transportation and storage assets.

In this context, Law No. 9478 of 1997 consolidated this new institutional scenario for the Brazilian oil industry, establishing the directives for its regulation. This regulatory framework, which regulated Constitutional Amendment No. 9 of 1995, was meant to encourage competition, attract investment in energy production, and regulate governmental participation in oil and natural gas exploration e production.

2.1 Legal Framework, Institutional Layout and Energy Policy

Brazil's oil & gas industry reform began formally in 1995 and was related to the Brazilian State Reform implemented during the administration of Fernando Henrique Cardoso. In keeping with the trend seen in several countries, Brazil adopted liberal policies in the '90s that transformed the infrastructure sectors. Thus, for the purpose of encouraging competition and attracting private investments to the sector, the federal government began designing a new model for the oil industry.

Continuing in this line, Constitutional Amendment No. 9 of 1995 legally broke up the Petrobras monopoly, exercised since 1953, over oil and natural gas exploration and development, oil refining, foreign trade of petroleum products, and transportation of oil, its derivatives, and natural gas.

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Formally, the ANP also enjoyed financial and managerial autonomy, being headed by a director general and four additional directors, named for four–year renewable terms. Designations for directors' positions are made by recommendation of the MME and the President of the Republic. Upon indication, the directors are examined by the *Comissão de Infra–estrutura do Senado*. Once approved by this Commission, the name of the aspiring director has to be approved by the plenary of the Senate.

To date, indications have always reflected political choices, although in many cases since the creation of the agencies, directors have had background and experience in the energy field, nominations have reflected the structure of power distribution and of assurance of the conditions required for governance. Since the return of democracy, the President's party has never achieved a majority in Congress. Therefore, it is necessary to form a coalition government with the participation of other political parties, in order to lay the groundwork on which to build governance. It is not uncommon in this process for public administration positions to be distributed among the parties of the allied base. Regulatory agencies are not the exception in this process.

The same phenomenon is seen within State–owned companies, whose managerial positions are a stage for heated disputes among the parties that support the regime. Meanwhile, in the particular case of Petrobras, some of the managerial positions always end up being held by permanent staff in the company, although this type of designation also reflects a political selection by this or that party.

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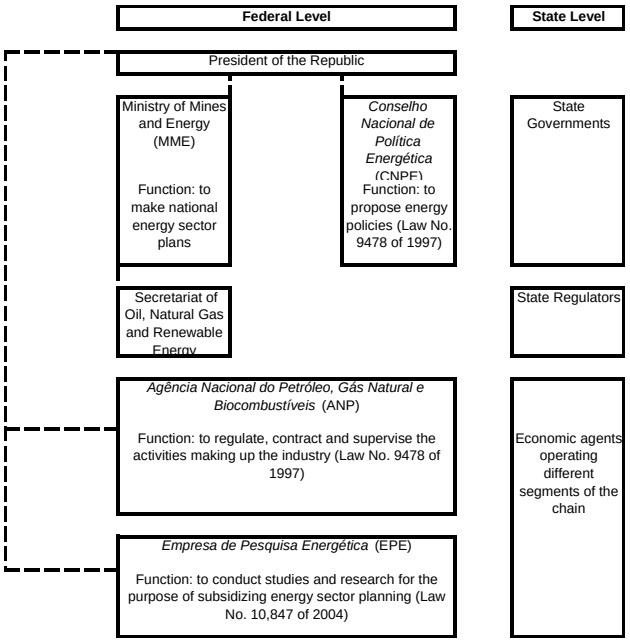
The 2003 change of administration, with the exit of President Fernando Henrique Cardoso and entry of President Luís Inácio Lula da Silva, did not cause any sudden changes in the policy guidelines of the oil & gas industry. In fact, the preference for gradualism in the liberalization process was not altered, and the search to strengthen Petrobras' leadership position in the sector, begun during the Cardoso administration, continued under Lula's regime.

Although there is no formal document summarizing the national energy policy orientations, Lula's administration has shown clear signs that State company privatization process will go no further during his term. As shown below, Petrobras' status as a mixed (public / private) company was not questioned, and the government kept its 51 % share as the majority stockholder. On the other hand, neither has Lula's government restricted Petrobras' business expansion and internationalization, as we will examine in detail in Section 6.

Figure 1 – Institutional Layout of Brazil's Oil & Gas Industry



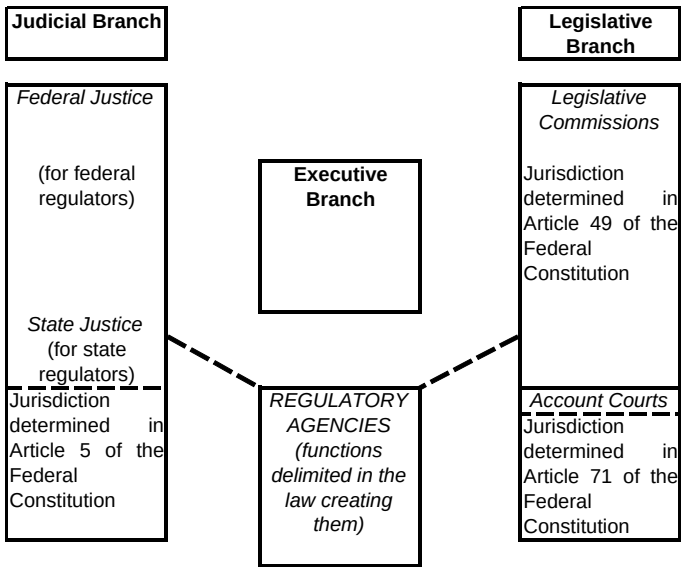
This institutional arrangement is still subject to a series of inter–related agencies and ministries. Of special note is the role of competition defence authorities. The *Secretaria de Direito Econômico* (SDE) / *Ministério da Justiça* and *Conselho Administrativo de Defesa Econômica* (CADE) / *Ministério da Fazenda* also have a role to play in regulating anti–competition practices, cartel formation and concentration activities.

This institutional setup is complemented with the role of the external control bodies. The regulatory agencies, being special autarchies (and therefore direct

public administration bodies), are subject to the country's same external control mechanisms, namely: The *Comissão de Infrastructure do Senado* (at the federal level), the *Comissões Parlamentares de Infrastructure* of the *Assembléias Estaduais* (at the state level), and the Federal and State *Tribunais de Contas* in the Legislative Branch, as well as the regulators in the Judicial Branch, were also subject to external control by the courts (since no decision can be exempt from the possibility of re–examination by the judges).

Relationships among the branches are reflected in the control they exert over the Regulatory Agencies, as summed up in Figure 2 below:

Figure 2 – Relationship among Branches and Regulatory Bodies



2.2 THE ANP MISSIONS

In the legal field, as of the elimination of institutional barriers to the entry of new agents, it became possible to open the competitive process with the participation of private companies in different activities of the industry, particularly the segments of exploration / production and marketing, considered potentially competitive.

Being regulations for a non–renewable natural resource industry, the goal in introducing competitive pressures and attracting private capital were in keeping with Federal control of ownership rights over oil and natural gas reserves.

As mentioned above, the law ratified Petrobras' property rights over production areas and refineries, over its pipeline and maritime transportation equipment and over its seaport and storage complexes.

Note that the attributions of ANP include a number of economic segments having fairly different market structures and technical–economic features. The oil and products industry is traditionally seen as having three production stages: up–stream (exploration and production phases), middle–stream (transportation and

refining) and down–stream (distribution and public sale). The possibility of importing crude oil and derivatives and the decentralized nature of distribution and public sale keep the oil and products industry from being characterized as a network industry. However, the natural gas industry is a classic illustration of a network industry, especially for the natural monopoly features of the transportation and distribution sectors.

These characteristics reveal that the ANP has quite a peculiar regulatory role to play. The purpose of this agency is to promote regulation, contracting and inspection of the activities making up that industry, to be carried out by state–owned or private companies, and primarily has the duty to:

(i) Implement the national oil, natural gas and biofuel policies contained within the national energy policy;

(ii) Inspect the activities making up the oil industry, whether directly or through agreements, and enforce the administrative and pecuniary penalties provided by the law, regulation or contract;

(iii) Promote studies that seek to delimit oil blocks for licensing exploration, development and production, in order to consolidate entry by new companies;

(iv) Announce and implement public contests for licensing of exploration, development and production, sign ongoing contracts and oversee their execution;

(v) Establish the payment structure and control for royalties and other governmental shares;

(vi) Establish the criteria for oil, products and natural gas transportation and marketing;

(vii) Set up the regulations for access to oil, products and natural gas transportation pipelines;

(viii) Enforce good practices for the conservation and rational use of oil, products and natural gas and the preservation of the environment;

(ix) Keep the data base updated and disseminate geological data on Brazil's sedimentary basins;

(x) Guarantee the supply of oil derivatives throughout the national territory;

(xi) Protect consumer interests in terms of product price, quality and supply;

(xii) Authorize execution of refining, processing, transportation, import, and export activities;

(xiii) Establish the criteria for calculating pipeline transportation rates and arbitrating their values;

(xiv) Specify the quality for oil products, natural gas and biofuels; and

(xv) Regulate and authorize activities relating to national fuel supply.

Specifically regarding inspection and control, the ANP receives the companies' statements on flows produced and marketed by the companies throughout the oil and gas chain. Failure to submit such information warrants action on behalf of the Agency. In addition to this, the ANP has a *Centro de Monitoramento* for follow–up of natural gas and liquids transportation flows. Inspection at any of the segments is scheduled and performed by the ANP, seeking particularly to monitor quality and detect cases of fuel adulteration.

In sum, the ANP is charged with protecting consumer interests in terms of product price, quality and supply, by regulating the different value chain activities of the oil and natural gas industries.

As with telecommunications and electricity agencies, one fundamental task during the first years of a regulatory agency's existence is to produce rules and regulations that regulate general aspects established in the laws of those agencies.

It is important to highlight that, contrary to the power and telecommunications regulatory agencies that were also created by Fernando Henrique Cardoso's State Reform Program, the ANP does not regulate prices, which were entirely liberalized in January 2002.

Under this new model, the State plays a regulatory role, transferring all exploration and production activities to companies through concession contracts entered into with the ANP.

In sum, the Oil Law established that all natural gas prospecting and production rights within Brazilian territory would continue belonging to the Federation, and that the ANP would administer it through concessions to public and private enterprises. It is noteworthy that the reform introduced no restrictions on vertical or horizontal integration of the chain, but allowed all agents to have any percent share of company ownership in the different segments of an energy product. However, there is a demand that production and transportation activities be carried out by companies that are legally distinct.

3. Impacts of the New Regulatory Framework for the Up–stream Segment*:* Entry of New Players

Despite the vast array of missions, it is an undeniable fact that the ANP's activities have been centred on organizing the entry process for new companies in the *up–stream* segment. Through the device of auctioning exploratory blocks, the

liberalization process went very well during the 1999–2005 period. Over 500 exploratory blocks were granted during the first seven (7) rounds carried out by the ANP.

When oil or gas is discovered, companies submit a statement to the ANP regarding the commerciality of the field and prepare a development schedule to begin the production phase.

Public competitive bidding is carried out under the "sealed envelope" model, by which those interested in an area offered to bids report the amount of the bid relating to the so–called "*bônus de assinatura*" (signing bonus) – a payment to the Union for the right to explore the oil block in question for a three–year period. The awardee is chosen among the candidates based on three criteria:

i) Highest monetary amount offered for the signing bonus;
ii) Commitment of the awarded company to develop an investment program based on equipment purchased together with the national industry; and
iii) Minimal exploratory program in work units to be converted into exploratory activities such as 2D and 3D seismics, potential methods and wildcat wells.

The main results of these auctions served to confirm Petrobras' leadership and completed most of the offers of blocks, based on geological experience with Brazil's sedimentary basins. The auctions were considered a success by reason of the number of interested participants (Table 1) and the variety of bonds signed (Table 2). The revenues from the government's participation in the seven Bidding Rounds,[2] completed between 1999 and 2005, reached a total of R$ 3.26 billion.

The results of this competitive bidding effectively demonstrated that the exploration and production monopoly had been broken. In this business segment, Petrobras hardly operated any exploration and production investment programs for over forty years. In fact, public contests allowed entry by new operators and attracted domestic and foreign private companies to participate in the national oil sector (Table 3).

Despite this increase in the number of operators, Petrobras remained the major company in the sector and the primary awardee of all competitive bidding rounds, as shown in Annex I. For the data offered in this annex, it is important to note that many blocks involved partnerships and consortia between entering companies and Petrobras. The need to share the risks and, above all, the technological competencies required for exploratory efforts in *off–shore* border areas, are factors that drove cooperation strategies between the international companies and Petrobras in restructuring the Brazilian *up–stream*. These strategies

[2] The eighth round, held in November 2006, was suspended by a judicial decision before works were completed. At the time this book was completed, no official decision had been made regarding the validity of the partial findings and the blocks offered for competitive bidding.

marked the entry of large global oil groups and internationalization of the up–stream sector in Brazil, showing that Petrobras' commitment was fundamental to the success of the up–stream sector's restructuring.

Table 4 classifies the best bids by the value of the signing bond payment.[3] It is noteworthy that in many cases, Petrobras was not the biggest awardee. This means that, in the strategic analysis of companies participating in the bidding process, it is necessary to make high bonus payments in order to equal the superior geological knowledge that Petrobras has regarding the sediment basins.[4] We must highlight that, based on the analysis in Annex I, the State company acquired most of the blocks offered for bids.

Table 1 – Number of Companies Participating in Oil Block Bids

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7
Stated interest	58	49	46	35	18	30	Part A – 53 Part B – 113
Paid fee to participate	39	48	44	33	14	27	Part A – 47 Part B – 92
Authorized	38	44	42	29	12	24	Part A – 46 Part B – 91
Presented bids	13	27	26	17	6	21	Part A – 32 Part B – 53
Awarded	11	16	22	14	6	19	Part A – 30 Part B – 16

Source: ANP

Table 2 – Collecting the Signing Bonus – 1999–2005

	Signing Bonus (R$)
Round 1	321,656,637.00
Round 2	468,259,069.00
Round 3	594,944,023.00
Round 4	92,377,971.00
Round 5	27,448,493.00
Round 6	665,196,028.00
Round 7 – Part A	1,085,802,800.00
Round 7 – Part B	3,045,804.00

Source: ANP

It is good to remember that until 1998, Petrobras only participated in the exploration business. In 2006, nearly 50 concession holders from over 15 countries, ten of which had domestic capital, operated in the Brazilian oil and natural gas

[3] The data refer to the six first rounds. It was not possible to obtain the data for the seventh round, as presented in Table 7. The eighth round, held in 2006, was interrupted by a judicial decision, due to a questioning of the rules presented in the bidding conditions.

[4] By the fifth round, the "menu" of blocks was changing, with an increase in the number of blocks and a reduction in the average area granted to each company. This explains the lower values collected in the form of "signing bonuses".

sector. Therefore, the opening of the up–stream segment may hold the promise of picking up the pace of oil discoveries and making it possible to improve the Proven Reserves / Production (R / P) indicator, which has currently levelled out at 19 years.

Table 3 – Companies being Awarded the Bidding Rounds

1999 *Round* 1	2000 *Round* 2	2001 *Round* 3	2002 *Round* 4	2003 *Round* 5	2004 *Round* 6	2005 *Round* 7
Amerada Hess	Amerada Hess	Amerada Hess	BHP Billiton	Aurizônia Empreendimentos Ltda.	Arbi Petróleo Ltda.	Amerada Hess Corporation
BP	BG	El Paso	Devon Energy	Maersk Olie og Gas AS	Aurizônia Empreendimentos Ltda.	ARBI Petróleo Ltda
British Borneo	Chevron	Enterprise	Dover	Newfield Exploration Company	Devon Energy Corporation	Aurizônia Petróleo Ltda
Eni	Coastal	Esso	El Paso	Partex Oil and Gas (Holdings) Corporation	EnCana Corporation	BG Energy Holdings Limited
Esso	Ipiranga	Ipiranga	Maersk	Petróleo Brasileiro S.A.	Epic Gas International Serviços do Brasil Ltda.	Brazalta Resources Corp
Kerr-McGee	Odebrecht	Kerr-McGee	Newfield	Synergy Group Corp	Kerr-McGee Corporation	Companhia de Des. Eco. de Min Gerais - CODEMIG
Petrobras	PanCanadian	Koch	Partex		Partex Oil and Gas (Holdings) Corporation	Delp Engenharia Mecânica Ltda
Shell	Petrobras	Maersk	Petrobras		Petróleo Brasileiro S.A.	Devon Energy Corporation
Texaco	Petrogal	Ocean	PetroRecôncavo		Petróleos de Portugal - Petrogal S.A.	Encana Corporation
YPF	Queiroz Galvão	PanCanadian	Queiroz Galvão		PetroRecôncavo S.A.	ENGEPET - Empresa de Engenharia de Petróleo Ltda
Unocal	Rainier	Petrobras	Shell		PortSea Oil & Gas NL	Eni SpA
	Santa Fé	Petrogal	Starfish		Queiroz Galvão Perfurações S.A.	Koch Petróleo do Brasil Ltda
	Shell	Petroserv	Statoil		Repsol YPF Brasil S.A.	Logos Engenharia S.A
	SK	Phillips	Unocal		Shell Brasil Ltda.	Norse Energy Corp ASA
	UPR	Queiroz Galvão			SK Corporation	Oil M&S S.A
	YPF	Rainier			Starfish Oil & Gas S.A.	Orteng Equipamentos e Sistema Ltda
		Repsol-YPF			Statoil ASA	Partex Oil and Gas (Holdings) Corporation
		Samson			Synergy Group Corp	Petróleo Brasileiro S.A. - Petrobr
		Shell			W. Washington Empreendimentos e Participações Ltda.	Petróleos de Portugal - Petroga S.A
		Statoil				Phoenix Empreendimentos Ltda
		Total Fina Elf				Repsol YPF S.A
		Wintershall				Shell Brasil Ltda
						Silver Marlin Exploração e Produção de Petroleo e Gás Ltd
						Starfish Oil & Gas S.A.
						Statoil ASA
						Synergy Group Corp
						Tarmar Terminais Aero-Rodo-Marítimos Ltda
						Vitória Ambiental Engenharia e Tecnologia S/A
						W. Washington Empreendimento e Participações Ltda

Source: ANP

Table 4
Primary Awarded Companies in
Bidding Contests for Oil Exploration in Brazil

Blocks Offered for Bids	Awarded Company / Consortium	Value of the Signing Bonus
First Round		
BM–S–4	Agip* (100 %)	R$ 134,162,101
BM–C–4	Agip (55 %)*, YPF (45 %)	R$ 51,000,128
BM–ES–2	Unocal* (40.5 %), Texaco (32 %), YPF (27.5 %)	R$ 31,742,736
Second Round		
BM–S–9	Petrobras* (45 %), BG (30 %), YPF (25 %)	R$ 116,278,032
BM–S–10	Petrobras* (50 %), BG (25 %), Chevron (25)	R$ 101,995,032
BM–S–7	Chevron* (65 %), Petrobras (35 %)	R$ 67,635,032
Third Round		
BM–ES–11	Phillips* (100 %)	R$ 117,743,190
BM–C–15	Ocean (65 %), Amerada Hess (35 %)	R$ 74,000,000
BM–S–22	Amerada Hess* (80 %), Ocean (20 %)	R$ 59,040,234
BM–BAR–1	Petrobras* (100 %)	R$ 48,341,234
Fourth Round		
BM–S–29	*Maersk Olie OG Gas AS (100 %)	R$ 15,148,000
BM–C–24	*BHP Billiton Limited (100 %)	R$ 13,500,000
BM–J–3	*Petróleo Brasileiro S.A.(60 %), Statoil ASA (40 %)	R$ 13,201,777
Fifth Round		
J–M–115	Petrobras	R$ 7,923,665.00
J–M–63	Petrobras	R$ 3,317,506.00
J–M–5	Petrobras	R$ 2,320,257.00
Sixth Round		
ES–M–525	Petrobras*; Shell	R$ 82,300,009.00
C–M–101	Devon*; Encana; Kerr–McGee; SK	R$ 50,000,000.00
C–M–151	Petrobras*; Shell	R$ 34,111,007.00
C–M–61	Devon*; Kerr–McGee; SK	R$ 28,500,000.00
ES–M–523	Petrobras*	R$ 30,172,000.00

Source: ANP

3.1 MAJOR ASPECTS OF THE CONCESSION CONTRACTS

Once the bidding round has concluded, the concession contracts are assigned by the ANP, on behalf of the Union, and the awarded companies / consortia. The Agency accompanies the execution of these contracts, which establish:

1. Payment for occupation (or holding) of the areas;
2. Royalty payments;
3. Payment of special shares on fields with large volumes of production or high profitability;
4. The conditions for returning the areas;
5. The contract effective period and duration and the work terms and schedules for the exploration and production activities;
6. The commitment to purchase goods and services from domestic suppliers;
7. The commitment to fulfil the Minimal Exploratory Program proposed in the awarded bid;
8. The responsibilities of the concession holders, including those regarding environmental damages.

The Concession Contract also demands that concession holders fulfil the Minimal Exploratory Program proposed in the awarded bid within a three to eight year period. In that phase, the companies should gather data, conduct new geological and geophysical studies, drill exploratory wells, and valuate whether any discoveries are commercially viable.

As highlighted above, should a discovery be considered commercially viable, the concessionaire company should submit a development plan, work proposal and investment projection for the approval of the ANP before beginning production.

The Concession Contract even foresees that, in the case of a fuel shortage risk in the country, the concession holders will give priority to covering the needs of the domestic market. In order to ensure domestic supply, Law No. 9,478 of 1997 gave ANP the power to authorize exports of oil and natural gas and their derivatives.

The ANP is also responsible – directly of through agreements with agencies of the State or the Federal District – for continual follow–up and inspection of operations carried out in the awarded blocks. The purpose for this follow–up is to ensure that concession holders adopt the best practices of the international oil industry and abide by the relevant technical and scientific standards and procedures, also with a view to ensuring the safety of the personnel and equipment, conserving the reservoirs and other natural resources, and protecting the environment.

3.2 Structure and Levels of Government Revenues: Royalties and Special Shares

Another important power of the ANP was to structure a new tax regime for concession contracts, to be foreseen in calls for bids. In addition to the signing bonus for bidding contests, the following taxes were created: i) royalties – from 5 % to 10 % of all oil and gas production (Box 2.5); ii) special shares; and iii) payment to occupy or hold an area.

Oil royalties in Brazil are financial compensations paid to the States and Municipalities, to the Navy Command and to the Ministry of Science and Technology, by the concessionaires of oil and natural gas exploration and production activities.

Royalties are calculated monthly for each producing field by applying the aliquot to the production value. This amount, in turn, is obtained by multiplying oil and natural gas volumes produced during a given month by the respective reference prices for that month.

The methodology for calculating the minimal price of domestic oil produced in each field is given by a parametric formula that takes the Brent oil price as a reference and considers the Real / Dollar exchange rate (both amounts as quoted for the month of production):

Pmin: TC x 6.2898 x (P.Brent + D)

Where:

Pmin – is the minimum price of domestic oil in the field, in Reales per cubic meter;

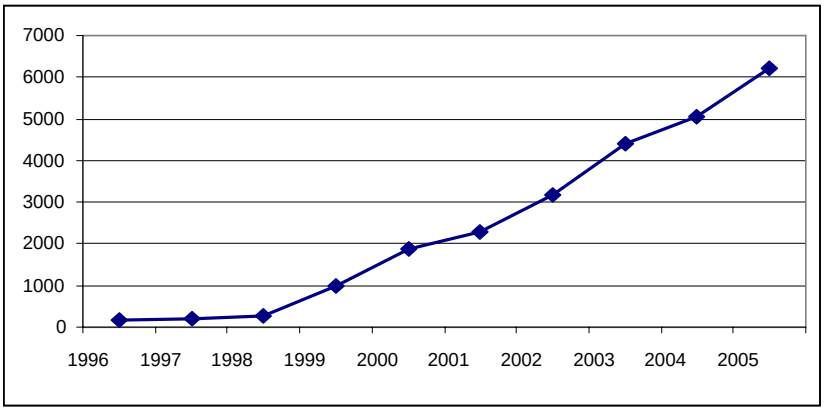
TC – is the monthly average value of the daily exchange rates for purchase of US Dollars, set by the *Banco Central do Brasil* for the month;

P.Brent – is the average monthly value of the daily Brent oil prices, quoted in *Platt's Crude Oil Marketwire*, in US Dollars per barrel, for the month;

D – is the difference between domestic oil prices and Brent oil prices, in US Dollars per barrel.

This change, introduced by the new legal framework, allowed a notable increase in total royalty takings, stated in current Reales (Graph 1 below). Despite the appreciation of the Real during the 2003–2006 period, all throughout there was a strong growth in takings, influenced by the rise in oil quotes and by the increase in domestic production of this energy product. Total takings leapt from a level R$ 200 million Reales prior to the changes to revenues of over R$ 6 billion Reales in 1998. For a detailed analysis, see Serra (2005), Pacheco (2003) and Fernandes (2007).

Graph 1 – Royalties Collections (R$ million)



Source: Self–prepared based on ANP data.

Special Shares are extraordinary financial compensations to be paid by concession holders in cases of large production volumes or great profitability. From the beginning of collection in 2000 to the seventh round in 2005, nearly R$ 22.5 billion were collected as Special Shares.

The payment for occupying or holding an area is made annually by concession holders. Its initial value is established in the invitation to bids and in the concession contract, and is set by square kilometre or fraction of the block surface area. By 2005, the total amount collected was approximately R$ 845 million. Table 5 summarizes the evolution of tax collections throughout the 1995–2005 period.

Table 5 – Governmental Shares (millions of R$)

	Royalties	**Special Participation**	**Signing Bonus**	**Fee to Use or Holding area fee**
1995	123	-	-	-
1996	154	-	-	-
1997	190	-	-	-
1998	284	-	-	29
1999	984	-	322	73
2000	1,868	1,039	468	91
2001	2,303	1,722	595	125
2002	3,184	2,510	92	147
2003	4,396	4,997	27	126
2004	5,043	5,272	665	124
2005	6.206	6.967	1.089	130

Source: ANP

4. Impacts of the Reform for the Down–stream Segment: *De Jure* Liberalization with *De Facto* Monopoly

Brazil's down–stream restructuring began in 1990, when the *Conselho Nacional de Petróleo* (CNP) was eliminated and replaced with the *Departamento Nacional de Combustíveis* (DNC). This measure, changed the relations between the State and the primary agent of the industry, Petrobras. This body went from being directly under the Presidency of the Republic, as the CNP was since its creation in 1938, to being controlled by the Ministry of Mines and Energy (MME).

It was this institutional reform that made it possible to operationalize changes in the management of final consumer prices for oil products. The practices of setting prices and controlling distribution and retail margins, once performed by the CNP, were substituted by the definition of maximum price "ceilings," which from 1996 were gradually eliminated (Martinez, 1999) until their total liberalization by year–end 2001.

Meanwhile, the price–setting structure for refinery products (ex–refinery prices) was modified, with the 1998 nation–wide extinction of the consumer price levelling mechanism, the *Frete de Uniformização de Preços* (FUP), which subsidized oil product supplies in the remote regions of the country (Inter–Ministerial Resolution No. 3). Prices quoted for each oil derivative produced by Petrobras' refining business (sales prices) became defined by the opportunity cost, based on international benchmarks, in addition to the transportation and customs costs. However, invoicing for distributors was still defined until January 2002, when in a joint measure by the Ministry of Mines and Energy and the Treasury Department,[5] prices were liberalized in all links of the Brazilian oil and oil products chain.

4.1 Product Refining Structure in Brazil

Brazil's refining capacity is structured around 14 plants, including a schist processing unit and a lubricant factory. The 12 refineries in operation peaked in 2000 at a nominal capacity of around 1.95 million barrels, and an effective capacity of nearly 90 % of that total. Petrobras holds 98 % of the total refining capacity and the private refineries (Manguinhos and Ipiranga) produce primarily gasoline and special products meant for local markets.

The average size of Brazil's refineries is 140 thousand barrels per day (table 6). However, most of the plants have a refining capacity of over 150 thousand barrels per day, the exceptions being the Recap (SP) and Remam (AM) refineries, with 53 and 46 thousand barrels per day, respectively, both of which were acquired by private initiatives. In the 8 (eight) refineries built by Petrobras, between 1953 and the end of 1970, the average refining rate is 230 thousand barrels per day, with the Replan (352 thousand barrels per day), Relam (306 thousand barrels per day) and Reduc (242 thousand barrels per day) standing out.

[5] The difference between the invoicing price and the sales prices, called the *Parcela de Preço Específica* (PPE), continued to be used with a view to: i) maintaining the remaining subsidies on fuels such as hydrated alcohol and liquefied petroleum gas (LPG); and ii) lowering the remaining balance in the Oil Account to the favour of Petrobras – carried over from the former practice of derivative invoice pricing below the Mean Reference Value.

Table 6 – Refining Capacity (m³ / working day) – Brazil

Refineries	2005
	Thousand barrels / day
TOTAL	2008.1
IPIRANGA (RS)	17.0
LUBNOR (CE)	6.3
MANGUINHOS (RJ)	13.8
RECAP (SP)	53.5
REDUC (RJ)	242.2
REFAP (RS)	188.7
REGAP (MG)	151.0
REMAN (AM)	45.9
REPAR (PR)	188.7
REPLAN (SP)	364.8
REVAP (SP)	251.6
RLAM (BA)	314.8
RPBC (SP)	169.8

Source: ANP

Another important feature of Brazilian refining is its spatial concentration, as its construction sought to optimize the overall number by maximizing the economies of scale in production while minimizing the diseconomies of scale in distribution. Therefore, the refineries were built on sites near major consumption centres. The purpose was to "minimize the total cost of supply" (Santos, 2000), that is, to "avoid spending oil to transport oil" (Martinez, 1999, p. 192). It was only in 1995 that fuel distributors began contracting oil product transportation directly, as until then it was centrally regulated by the DNC, the agency that defined the modalities to be used – granting priority to pipelines and tanker ships – as well as the tariffs (Martins, 2003).

The rationale for optimizing transportation costs in supplying refineries and distributing their products lead, on the one hand, to concentrating the refining business in the southern and south–eastern regions, which jointly represent 81 % of the total refining capacity, plus 90 % of all production of the 2 primary oil products – gasoline and diesel –with 2/3 of all gasoline consumption and 64 % of all diesel consumption (Martins, 2003). On the other hand, it lead to specialized production, as each refinery processes a limited number of oil products, with the exception of those in highest demand (gasoline, diesel, LPG, and fuel oil), which are produced in all the refineries. This specialized production is seen in the degree of complexity of Brazil's refineries, although part of that complexity is due to their adaptation to process domestic oil.[6]

[6] Out of the total of 39 products manufactured in Brazil's refineries, none of them singularly produces more than 19. Special derivatives are produced in few units and supply the entire domestic market and/or are supplemented by imports: Reduc (RJ) produces over 70% of all lubricant oils; Refap (RS) and Relam (BA), near the petrochemical poles of Sul and Nordeste, are responsible for nearly one half of all naphtha production; RPBC (SP) is responsible for all domestic production of aviation fuel and premium gasoline. For that reason, the average Complexity Indicator (CI) – the sum of the

Adapting the refining capacity to a reduction of fuel oil in Brazil's energy matrix –estimated at 25 % by 2010 – is the main change seen in the supply of oil products, resulting from long–term alterations in Brazil's fuel demand profile.

To address the future dynamics of domestic demand, however, the main issue for 2007, assuming current trends in Brazil's down–stream arrangement remain the same and sustained growth of domestic crude oil production, is the quality of the commercial balance between crude oil production and the domestic demand for oil products. Brazil tends to be a net exporter of crude and a net importer of white derivatives (diesel, naphtha and LPG), whose commercial value is superior to that of oil.

It is this perspective which lead to the discussion about up–scaling Brazil's current refining capacity, whether by expanding an existing unit, as proposed by Petrobras, or by implementing one or two new refineries of 150 to 200 thousand barrels per day, as suggested by the ANP.

This debate, which escaped the closed rooms of the specialists in the sector and grew to include the greater public, illustrates the solutions discussed have neglected the results sought by introducing competitive pressures in the Brazilian derivatives market, especially those relating to international capital interests in investing in new refineries and those that would seek to expand imports of derivatives that are lacking in the Brazilian market.

The expansion of domestic refining capacity, a topic that is now latent on the agenda of the Federal Government and more explicitly on the agendas of various States of the Federation, for the development of Brazil's down–stream sector, will tend to follow cooperation strategies, now dominant in the world oil industry and in the Brazilian experience with up–stream restructuring.

4.2 Distribution of Derivatives in Brazil

The fuel distribution stage begins at the refineries that produce the derivatives for sale to fuel dealers. In Brazil, in contrast with other countries that organized their oil industries in a vertical, monopolistic way, the distribution was always shared by several companies, thus constituting a competitive oligopoly in which Shell, Esso, Texaco, Ipiranga, Atlantic, and others have stood out. It is important to note that Petrobras' participation in this link of the oil chain was actually belated, as the subsidiary *BR Distribuidora* was only established in 1971, seventeen years after Petrobras was created.

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installed capacity of all vacuum distillation units, coking, cracking, and catalytic reforming, relative to the nominal capacity of atmospheric distillation – of all Brazilian refineries is 0.64. Of note among the more complex refineries are RPBC (SP), Regap (MG) and Revap (SP), all with a CI of over 0.75 (Martins, 2003).

The process of opening up the oil industry, as of the second half of the '90s, changed the market structure, although a cluster of companies is primarily responsible for derivatives distribution.

Deregulation of the Brazilian fuel supply sector began in the '90s and ended with complete opening of the market in January 2002.

The new regulatory model for Brazil's down–stream sector, regulated by the ANP, aims to increase the number of derivative supply alternatives on the domestic market, thus enabling competition among suppliers. With this goal in mind, the new model sought to enrich the diversity of economic agents acting in the market.

For this purpose, new categories of economic agents were defined in the derivative distribution segment. The main changes to the organizational model for this sector have to do with the introduction of "Formulators", "Importers" and *Transportadores Revendedores Retalhistas* (TRRs – retail transportation companies), who constitute different legal entities from the other agents in the market.

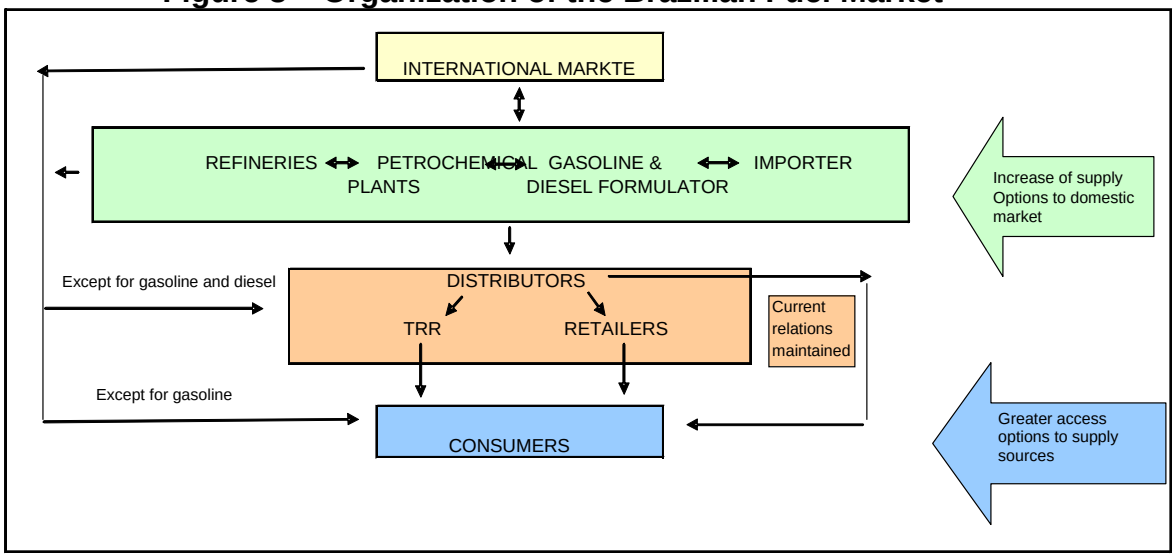
The formulator is authorized to import and/or purchase liquid hydrocarbon flows on the domestic market, from which gasoline A[7] and diesel are formulated. In theory, Formulators increase the potential supply, as they afford Importers greater flexibility instead of being restricted to the international market of finished products (gasoline and diesel). Importers, in turn, are authorized to import Gasoline A, diesel, solvents and other products.

Under this new model, not only Petrobras will have direct access to the international market of oil and derivatives, but also private refineries, petrochemical plants, gasoline and diesel formulators, and importers. This has expanded the supply possibilities for dealers and retail transportation companies. Keep in mind that retail transportation companies supply fuels directly to consumers. Furthermore, retail transportation companies provide other services such as installing storage tanks and equipment in consumer establishments and assessment in the correct use of and handling of products.

The current configuration of the distribution segment is summarized in Figure 3.

[7] It is important to note that Gasoline A does not contain anhydrous alcohol in the mix. The so–called "Gasoline C" is a blended fuel containing a mixture of gasoline A with a percentage of anhydrous alcohol. Historically, these percentages have ranged from 20 % to 25 % alcohol per liter of Gasoline C, and defining this percentage may even be used for energy policy purposes, with volumes regulated according to the availability of alcohol supply.

Figure 3 – Organization of the Brazilian Fuel Market



Source: ANP

These changes reduced the barriers to the entry of new agents in the distribution segment. Accordingly, this made it necessary to reinforce the ANP's competencies for inspection and regulation of the sector, particularly marketed fuel quality.

Keep in mind that as of Law No. 9,478 of 1997, the ANP took on the duties of the former DNC relating to the business of oil product and alcohol distribution and retail sales. In this regard, one of the regulatory agency's main missions in the distribution segment is fuel quality regulation.

This quality is defined by a set of physical and chemical characteristics set forth in the *Normas Brasileiras* (NBR – Brazilian standards) and *Métodos Brasileiros* (MB – Brazilian methods) of the *Associação Brasileira de Normas Técnicas* (ABNT) and the standards of the American Society for Testing and Materials (ASTM). In conformity with Law No. 9,478 of 1997, the ANP sets limits on these characteristics in order to ensure appropriate fuel performance. Thus, the Agency is responsible to regulate the quality of oil products through rules established in decrees, instructions and resolutions, for the purpose of protecting society in terms of fuel appropriateness for use and the environment.

On the supply side, the ANP is charged with regulating the activities of dealers and retailers of liquefied petroleum gas (LPG), anhydrous and hydrous alcohol, LNG, and VNG, as well as the activities of retail transportation companies for diesel, fuel oil, and aviation and lighting kerosene. Furthermore, this regulatory body is responsible for surveying fuel sales prices and margins used in ANP–authorized establishments.

4.3 Incomplete Down–Stream Opening

It is indisputable that, as of 1995, the administration of Fernando Henrique Cardoso (1995–2002) took an important step in the process of reforming and opening the Brazilian petroleum derivative market. Price liberalization at all stages of the production chain signalled the continuance of a gradual reform process that has been going on since the early '90s. This liberalization went hand in hand with the creation of the *Contribuição de Intervenção de Domínio Econômico* (CIDE) to replace the former *Parcela de Preço Específica* (PPE), whose purpose was to support a policy of crossed subsidies among petroleum derivatives.Since this was an instrument that reflected the relation between Petrobras and the Treasury, Energy Planning Project could not be charged by potential derivative importers, as CIDE was. The elimination of the PPE and creation of the CIDE marked a new stage in the complex process of setting internal prices for petroleum derivatives. This was expected to fuel competitive pressures, favouring the entry of companies with the capacity to import petroleum derivatives. CIDE could still work as a kind of buffer against the impact on derivatives of rising international oil prices, as conceived in several European countries. Initially, Petrobras adopted the behaviour of frequent, successive fuel price adjustments, passing on the impacts of dollar and oil price hikes to the final consumers.

After the intense debates of the first semester, the second half of 2002 was even more difficult in terms of fuel price decisions. Oil prices went from US$ 18 to 19 per barrel, levelling off in September at US$ 28–30 per barrel. By October of that same year, exchange rate devaluation lead to dollar quotes of around R$ 4. Fuel prices, however, particularly gasoline, diesel and LPG, remained stable from early July until they rose in November 2002. This episode left it clear that Petrobras would not begin automatically aligning domestic fuel prices with international price fluctuations. This behaviour, attributed to Petrobras' dominant position, has caused uncertainty and hampered decision–making processes in all companies.

Despite the change of administration, price–setting criteria have not become clearer. The dramatic rise in oil prices since 2003 has not been fully examined and no signal has been sent out to consumers and other agents operating in this market regarding the price–setting process, which has feed the sources of uncertainty.

Therefore, these problems of non–alignment of domestic oil prices with international rates have been seen in the administrations of both Fernando Henrique Cardoso and Lula (Graph 8). It would be advisable to study more deeply the reasons for the erratic price swings and the reserved intervention spaces in a supposedly open market.

What has been noticed is the presence of a double market distortion, which reveals the insufficiency of current economic instruments to correct the problems arising from the opening process. The first distortion is microeconomic and has to do with issues of derivative price–setting in the domestic market. The second is microeconomic and concerns the undue space for intervention that the domestic oil industry's current model reserves for the executive power.

Let us examine its consequences.

The microeconomic aspect is crucial to gain an understanding of the players' game and of the current debate. Petrobras holds over 95 % of the refining capacity and is therefore the company with dominant market power in this segment. A firm with such competitive advantages, be it public or private, plays the role of price maker. Under such conditions, the dominant firm sets the referential prices for the market, and the rest of the competitors are forced to set their prices following the behaviour of the leading company. It can even hinder entry by other operators by temporarily accepting lower prices in order to dissuade competitors from entering.

This is precisely the situation that has often occurred in the petroleum derivative market. Companies that could potentially take a slice of the market from Petrobras through derivative imports, and the smaller domestic refineries, have reduced margins or even negative figures whenever Petrobras sets its prices below those seen in the international market. It is important to state for the record that any company in the position of Petrobras will tend to act in this way. Under such conditions of asymmetric competition, the government should create instruments to correct the failings seen in this type of market structure.

The macroeconomic distortion has to do with the Executive Power's possibility to intervene in prices, in order to solve social, political–electoral and/or macroeconomic problems. This distortion is greater yet when the lead company is State–owned. In this case the government may, for example, "hold" prices in order to contain inflation. Brazil's economic history is full of examples of this type of distortion. In the case discussed here, we mentioned above that this type of practice was seen in the administrations of both Fernando Henrique Cardoso and Lula.

These observations reveal that the main problem in today's petroleum derivative market is the lack of transparency in the price–setting process and the lack of effective instruments to deal with the impacts of oil price volatility on the international market, both in times of steep rises, as seen this year, and in times of price reduction.

The only existing economic instrument was never used effectively. Bear in mind that the CIDE was conceived as a buffer against the impacts of international prices on the domestic market. CIDE makes it possible for the Brazilian government to collect around R$ 10 billion yearly. However, once again the macro–micro conflict comes into play, since primary surplus goals limit this type of use. It is difficult to imagine, with such macroeconomic restrictions, that the government would accept losing a large part of its fiscal revenues.

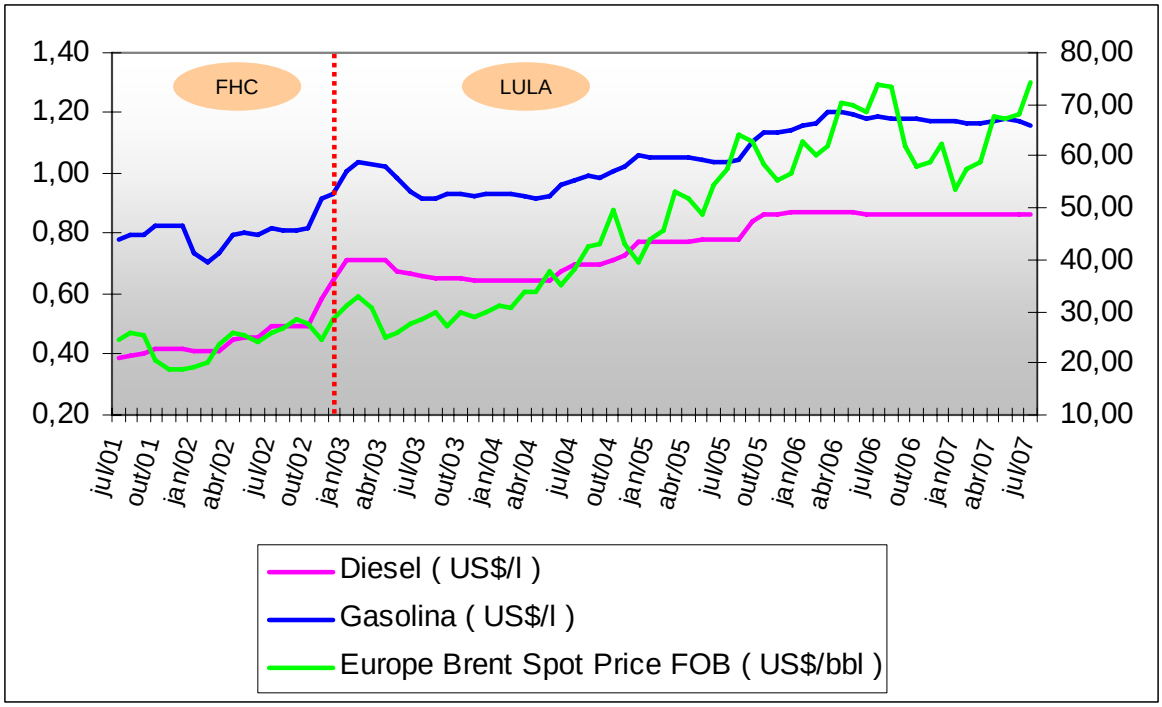
These examples only strengthen the argument that the model of opening the oil and derivatives industry is incomplete and insufficient in terms of correction instruments.

The problem of the lack of transparency in price–setting for petroleum derivatives is serious. Faced with an instable international market, economic agents are unnecessary given additional sources uncertainty, especially as regards the frequency and magnitude of expected readjustments for derivatives, making it extremely difficult to implement a monetary policy, anchored in the inflation goals regime. Economic agents end up anticipating fuel price revisions –often unnecessarily– in their previsions for inflation.

This type of problem is not impossible to solve. It only requires evaluation regulations that could be established by Petrobras itself and approved by the government, in order to lend transparency to the price–setting process. The need for rules and greater transparency is greater yet if we recall that Petrobras will continue to dominate the refining market for many years, since the market structure chosen during the liberalization process –advanced by the previous administration and approved by the National Congress– legitimated that company's market power in this segment of the industry. Even in the optimistic scenario, with the entry of new refining operators within a fifteen–year horizon, Petrobras' leadership position will be hard to reverse.

International experience affords several examples that could serve as references for creating an instrument suited to the reality of Brazil's fuel market. Given the structural characteristics of the Brazilian petroleum derivatives industry, particularly in the refining segment, the creation of a set of clearer, more transparent price–setting rules would contribute immensely to the process of attracting new investments for the industry and would ensure greater predictability with regard to the impacts of fuel price readjustments on inflation. Otherwise, microeconomic and macroeconomic distortions will continue having perverse effects on the performance of the domestic oil and oil products industry and on the attainment of macroeconomic policy goals.

Graph 8 – Evolution of Derivatives Prices vis–à–vis International Oil Prices



Source: ANP and IEA

Despite being a regulatory agency, Law 9478 failed to give the ANP any role regarding price regulation. We believe that this restriction distorts the regulatory agency's structuring and directing missions. This is due to Petrobras' dominant share (> 95 %) in the refining segment.

The main (and worst) finding is that Brazil has no transparent fuel price policy. This is due to the capital problem mentioned in any manual of economics: a firm having monopoly power cannot set its prices freely and, therefore, must be regulated in order to avoid abuse of dominant position. In the case of State–owned companies, price–setting rules should also be clear in order to avoid opportunistic behaviour by the Executive.

The mistake in the liberalization process was having left it open for Petrobras to set its own prices or for the Executive to take advantage of the company's position any time to control prices under anti–inflationary policies or to sustain higher tax and dividends revenues in detriment of the consumers' interests. Both practices are perverse and completely distort the energy price structure. Furthermore, they create barriers for new agents to enter the industry, which prevents the growth of investments in the sector.

In this sense, even if it were not a price regulatory agency, the ANP would be responsible to take a more active role in monitoring the market structure and in systematic follow–up of price setting at the refinery and for final consumers. The

price survey done by the ANP was a step in that direction. However, the database without the support of analytic studies is not very useful to defend consumer's interests and subsidize government decisions.

In addition, systematic studies will also help improve quality control and inspection results. In this regard, the ANP made much progress but has not yet been able to minimize the issues of fraud and adulteration. It is important also to find out whether changes in the organizational structure could improve the inspection role. Separating the superintendents of quality and supply within the ANP reduces the manoeuvring margin for coordinated actions and sharing information that is essential to inspection.

Due to the nature of these types of problems and the ever–present signs of distortion in the conditions of competition and cartelization of positions, the ANP should strengthen its institutional partnership with authorities responsible for regulating competition in Brazil (CADE and SDE).

5. Impacts of the New Regulatory Framework for the Natural Gas Industry

As of the '90s, the natural gas industry (NGI) acquired a new status in Brazil's energy policy due to two major factors: i) the discovery of large reserves in *Bacia de Campos*, followed by a rise in associated gas production;[8] and ii) the progress made in negotiations as of 1994, to import 30 million m³ per day of gas from Bolivia. Given the growing availability of gas resources, both domestic and imported, the Ministry of Mines and Energy began to make general use of natural gas one of the priorities of the energy sector.

The sector reforms and privatization program of the '90s, particularly in the electric sector, signalled new opportunities for private investors in generation. In this new context, the geothermal gas–driven plants were in theory an effort that better suited the risk profile of private capital because it required smaller scales and shorter turn–around times. The decline in the hydroelectric generation situation favoured implementation of the ambitious *Programa Prioritário de Termelétricas* (Thermoelectric Priority Program). In the natural gas industry, this program was perceived as the best chance to anchor gas demand, due to the fact that thermoelectric plants qualified as large consumers.

On the supply side, the increase in domestic production and formalization of the Brazil – Bolivia agreement, making it viable to build the gas pipeline between the two countries, appeared to finally set the stage to expand the natural gas industry. At that time, seeking to preserve the economic advantages of vertical integration of activities throughout the chain, Petrobras purchased shares in most State companies and consolidated its dominant position in the gas production chain, by

[8] As of 1985, the state of *Rio de Janeiro* became Brazil's premier producer of natural gas. State gas production reached 5 mm³ / day in 1985 and grew slowly to 7 mm³ / day in 1994. From that time on, production grew rapidly again with the increased oil production from *Bacia de Campos*, reaching 12 mm³ / day in 1998.

purchasing assets and internationalizing its activities up to the Bolivian up–stream segment.

However, the lack of a structured energy policy and the conflict among actions taken by different economic agents (Petrobras, distribution companies, industrial consumers, thermoelectric plants...) ended up sending the wrong signs, leading to imbalances in energy provision and supply security in both the electric and natural gas sectors.

In institutional and regulatory plans, the problems and risks inherent in expanding the industry became increasingly clear. Furthermore, with the development of a new institutional model for the electric sector in 2004, it became even more urgent to clearly define the institutional spaces regarding the interface between the electric and natural gas industries.

There is a strong strategic interdependence among agents in the industries of the existing network. Consequently the need to coordinate their decisions is crucial to reduce the complexity of the risks they involve. This aspect is even more important in markets that have not matured. This lack of coordinating mechanisms created a zone of uncertainty that hindered regulatory activities in matters of coordinating contractual regimes, modes of commercialization and organization of primary and secondary markets, tariff regulation, and access conditions to the transportation and distribution networks. In Brazil and other countries whose markets require large capital inputs in order to expand their networks, the central difficulty in financing projects is setting up a number of guarantees in order to reduce the investors' risks.

The beginning of operations on the Brazil–Bolivia gas pipeline (Gasbol) in 1999 was marked by insufficient demand, which commercially penalized Petrobras in its fulfilment of the "take or pay" clauses in the import contract. In this regard, the first disequilibrium identified was the paradoxical situation of importing gas while continuing to flare associated natural gas. It was therefore logical to indicate the options for commercializing gas to distributors, which began winning over industrial customers and encouraging other uses such as vehicular natural gas (VNG).

This situation opened the way, then, for the aforementioned launching of the Thermoelectric Priority Program. Despite the fact that most of these projects were not implemented, demand was greatly stimulated, with strong growth in industrial consumption, thermoelectric generation and the automobile segment (VNG). (See Table 7 and Graph 2.) From 1995 to 2000, total consumption grew by a yearly average of 12.4 %, and in the following five–year period, from 2000 to 2005, demand grew at a rate of 13.6 % per year.

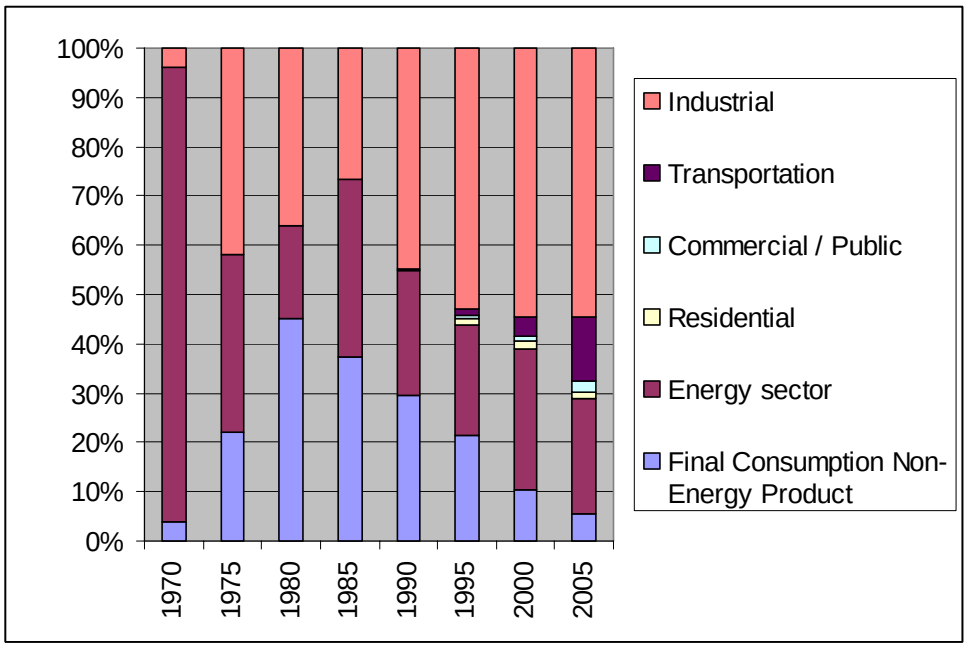
Table 7

Natural Gas Consumption in Brazil by Sectors (units m3)10

	1970	1975	1980	1985	1990	1995	2000	2005
Final Consumption	80	414	1,003	2,539	3,414	4,435	7,965	15,044
Final Consumption Non-Energy Product	3	92	452	948	1,010	956	831	849
Final Consumption Energy Product	77	322	551	1,591	2,404	3,479	7,134	14,195
Energy sector	74	149	188	911	859	989	2,278	3,500
Residential	-	-	-	-	5	52	114	217
Commercial / Public	-	-	-	-	3	36	86	321
Transportation	-	-	-	-	2	49	313	1,945
Industrial	3	173	363	680	1,535	2,353	4,343	8,209

Source: BEN, 2006

Graph 2



This significant growth made it viable to optimize use of the gas pipeline and justified beginning studies to expand it. Nevertheless, the first signs of supply security difficulties appeared in 2004. With the drought in Nordeste, it was not possible to operate the thermoelectric plants in that area appropriately due to the lack of gas. This led to increased efforts towards interconnecting the gas pipelines between Sudeste and Nordeste. Despite the coherence of this decision, the yellow light was already on, leading consumers to distrust supply conditions. They started to depend, on the medium term, on the Gasbol expansion, on imports from Bolivia (which began to see policy restrictions), on LNG imports, and on the production of reserves found in *Bacia de Santos* and *Espírito Santo*.

5.1. Incomplete Legal Framework and Regulatory Gaps in the Brazilian Natural Gas Industry

The means of industrial organization and contracts that were traditionally used during the nascent phases of the natural gas industry sought to reduce risks for the investments needed to build the transportation and distribution infrastructure. The creation of territorial monopolies, use of long–term contracts, and managed price policies were the primary instruments used to develop the natural gas industry in mature markets such as Argentina, the United Kingdom, and North America. It was possible to use these instruments due to their consistency with the overall economic context,[9] particularly as regards the dominant forms of industrial organization in other energy industries.[10]

The primary regulatory frameworks of the domestic gas industry are also Law No. 9,478 of 1997 and the Federal Constitution. This law, as stated above, defines the basic principles that direct the activities making up the oil and natural gas and biofuel industries. It is noteworthy that man of those principles are only just mentioned in the Petroleum Act, leaving it to the ANP to regulate them later.

As of the reform of article 25, paragraph 2 of the Federal Constitution through Amendment No. 05 of 1995, local states were enabled to provide distribution services within their respective territories or grant concessions for them to be operated by third parties: "*States may develop, whether directly or through concessions, local piped gas services permitted by law, and are forbidden to publish provisional measures until it is regulated.*"

Note, therefore, the existence of two types of jurisdiction for regulatory authorities in the natural gas industry: (i) The ANP has control over prospecting, production, importing, exporting, and interstate transportation up to the city gates; and (ii) the distribution and commercialization segments within states are under the jurisdiction of State Regulatory Authorities.

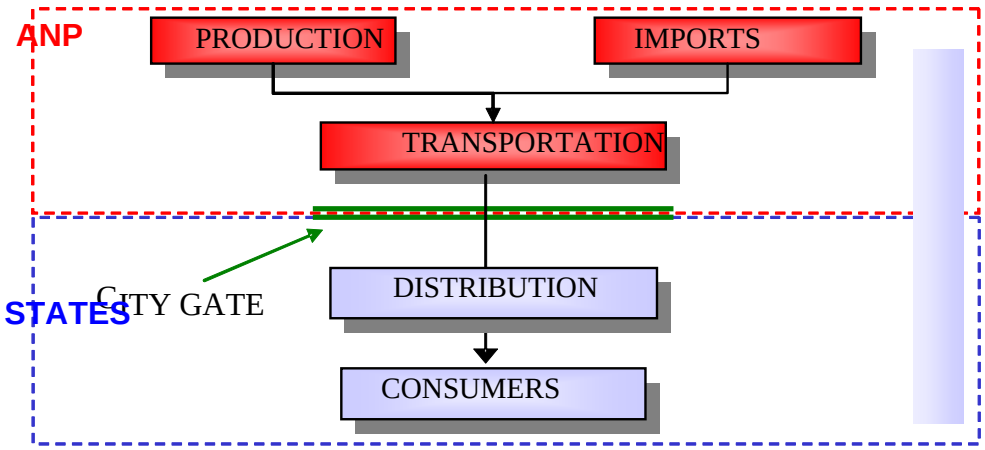
Since then, regulatory bodies with jurisdiction over the natural gas distribution segment have been created in the different states. In fact, some states have chosen to create State Regulatory Agencies and others State Secretariats with power to regulate, supervise and control distribution service provision within the geographic boundaries of the state.

Thus it is that the regulation of the domestic natural gas industry is under the responsibility of both the federal and state sphere, as shown in Figure 4 below.

Figure 4
Regulatory Competencies in the Brazilian Gas Industry

[9] The context is characterized by greater State intervention in the economy, especially in the infrastructure industries. This intervention occurred regularly in the infrastructure sectors in the form of price and tariff controls, State companies or private enterprise regulation.

[10] Sector monopolies granted to mostly vertical private or State–owned companies.



Natural Gas Quality

5.2 Issues Regulating Access to Transportation Pipelines

Access to natural gas transportation facilities is negotiated among interested parties as established in Article 58 of Law No. 9,478, which regulates third–party access to gas transport pipelines and makes the ANP directly responsible for: (i) tariff setting in cases of conflict among the involved agents; (ii) verifying whether prices agreed by parties are compatible with the market; and (iii) regulating the preference to be given owners of facilities in order to promote their maximum use.

> *"Art. 58.– Any interested party shall be able to use any transportation pipelines and maritime terminals, whether existing or to be built, upon appropriate remuneration to the owner of such facilities.*
>
> *§ 1º.– The ANP will set the rate and form of payment for appropriate remuneration if not agreed by the parties, and may also verify whether agreed amounts are compatible with the market.*
>
> *§ 2º.– The ANP will regulate the preference to be given facility owners for moving their own products, in order to promote maximum use of transportation capacity for available means."*

Initially, the above article was regulated by ANP Resolution No. 169 of 1998, from November 1998 to April 2001. In addition to regulating free access as such, this resolution contained provisions establishing certain criteria that were applicable to natural gas pipeline transportation tariffs, required certain information of the agents, and forbid transporter capacity assignment.

From 2000 to 2001, the ANP solved four conflicts over access to the Bolivia–Brasil gas pipeline(GASBOL), three of which referred provision of the *Serviço de Transporte Interruptível ou Não Firme* (STI) and one to the *Serviço de Transporte Firme* (STF).

The first two processes, between *Transportadora Brasileira Gasoduto Bolívia–Brasil S.A.* (TBG), the company operating the GASBOL, and ENERSIL, a company of the Enron group, referred to the same non–fixed natural gas transportation service contract. This case was a pioneer in the country, due both to its use of Article 58 of the Oil Law, which subjected oil & gas pipelines and maritime terminals to the free access regime, and its contracting of an interruptible gas transportation service.

The two following cases, between TBG and BG (*British Gas do Brasil Ltda.*), referred to a non–fixed service and a fixed short–term service. The first, based on the principle of non–discrimination, followed the line defined for resolution of the Enersil case. Despite the different nature of the service, the second followed some of the concepts established in the previous cases, such as defining tariffs in relation to the distance between the points of reception and delivery. The latter case, the first involving provision of a fixed service, turned out to be the first case of gas volume trading to benefit from Brazil's regime of free access to gas pipelines.

Due to the size and complexity of transportation pipelines, a process of developing new regulations began (the first referendum was held in February 2001), and the decision was made to divide the norm into four distinct regulations, separated by topics: (i) the Access to Infrastructure Resolution; (ii) the Tariff Criteria Resolution; (iii) the Transportation Capacity Transfer Resolution; and (iv) the Information Requirement Resolution.

The initiative to hold an open contest based on ANP Resolution No. 98 of 2001 should be highlighted. Within the context of the 2001 electric energy rationing and the probability of a significant demand surge for thermoelectric generation, the process established procedures for offering and allocating capacity due to the expansion of existing gas pipelines, seeking to create equal opportunities for new agents in natural gas supply.

ANP Resolution No. 98 of 2001 sought to balance the need for investments to expand gas pipeline facilities and, as established in Law No. 9,478 of 1997, to promote gas supply competition by ensuring fair, non–discriminatory conditions of access to the transportation network.

The Open Contest procedure was begun, then, by the companies TBG and *PETROBRAS Transporte S.A*. (TRANSPETRO), as of the call for bids. Nevertheless, in early 2002, due to energy supply and demand investments recorded in Brazil, the possibility of surpassing the existing gas transportation capacity switched suddenly to the opposite scenario of significant idleness, exacerbated by the maximum capacity estimation for the GASBOL project –around 30 million m^3 per day – between 2004 and 2007. These new circumstances contributed significantly to postponing the need to expand the aforementioned pipeline and, therefore, to hold the Open Contest.

Since late 2005, however, a scenario of increased natural gas demand and a supply deficit for that energy product, is foreseen for Brazil, due especially to the imminent depletion of GASBOL's idle capacity and the existence of bottlenecks in the national gas transportation network.

In this context, it is interesting to note that natural gas consumption in the country has been showing significant growth rates. According to the most recent 2005 data from the 2006 National Energy Balance, published by the *Empresa de Pesquisa Energética* (EPE), natural gas represents 9.4 % of all domestic energy supply, in contrast to its 5.4 % share in 2000. Thus, for the 2000–2006 period, the recorded growth rate was approximately 36.1 % in the automobile segment, 11.6 % in the commercial sector and 28.4 % in the generation industry (EPE, 2006).

Therefore, it was urgent to resume discussions of effective actions to expand natural gas transportation capacity, with a view to attend to the needs of the Brazilian market.

With regard to this topic, after ANP Resolution No. 98 of 2001 was revoked by ANP Resolution No. 27 of 2005, the scope of the capacity offering procedure was

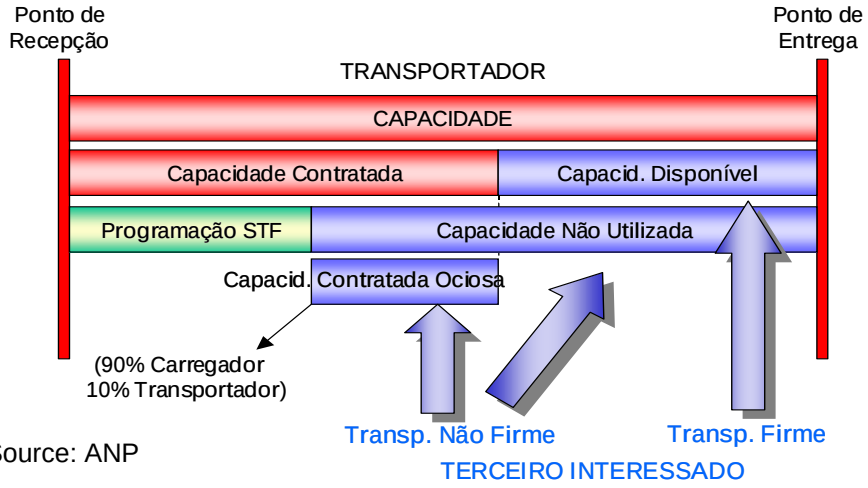
extended to cover not only the expansion of existing gas pipelines, but also the construction of new ones.

Note that for the Open Contest procedure, ANP Resolution No. 27 of 2005 adopted the name of *Concurso Público de Alocação de Capacidade (CPAC – public contest for capacity awarding)* and regulated the use of natural gas pipeline facilities with adequate remuneration to transporters, establishing at the end of Article 7 that "*all available transportation capacity for contracting a* Serviço de Transporte Firme *(STF) shall be bid and awarded in accordance with the procedures of Concurso Público de Alocação de Capacidade (CPAC).*"

In this way, transporters will allow non–discriminatory access to their transportation facilities, as well as connecting their facilities to others, except when the service request refers to transportation facilities less having than 6 years from start–up of their commercial operations. This period was set based on the idea that it was sufficient to reach maximum use of pipeline capacity, without establishing it, so far, as a period that will ensure a return on investments.

Third–party access will be given by contracting idle capacity through the STI, or available capacity through the STF or STI. Available capacity means total pipeline capacity minus the contracted capacity. Idle capacity refers to contracted capacity subtracted from that which is being effectively utilized (scheduled for the STF), as shown in Figure 5 below.

Figure 5
Allocation of Gas Transportation Capacity



Source: ANP

Reception Point		Delivery Point
TRANSPORTER		
CAPACITY		
Contracted Capacity		Available Capacity
STF Programming	Unutilized Capacity	
	Idle Contracted Capacity	
90% Carrier 10% Transporter	Non-Firm Transportation	Firm Transportation
	INTERESTED THIRD PARTY	

The Statement of Interest contained in the CPAC Regulation is the initial document by which companies interested in contracting fixed transportation capacity present their intentions in terms of volumes, terms, points or zones of receipt and delivery. These statements serve transporters as sources of information on transportation capacity demand in their area of action, which contributes to the process of defining grid expansion projects.

We should say that Petrobras was the only company to come forward regarding the aforementioned facilities, and that this process is currently in the phase of project concept development.

We should mention, moreover, the beginning of a new CPAC procedure that is being conducted by the TBG, whose regulations were approved by the ANP on May 24, 2007. In this process, Petrobras was again the only company to present a Statement of Interest, requesting 5.2 MM m^3 per day. This CPAC is currently in the stage of development and approval of the Letter of Invitation.

Finally, a short analysis can be drawn up of the competitive strategy for the dominant agent in the natural gas industry.

Although current regulations have contributed to dissolving PETROBRAS' legal monopoly and de–verticalizing the sector, it still has significant gaps that require specific treatment in order to effectively meet the goals set forth primarily in Law No. 9,478 of 1997, or promote competition in natural gas supply and marketing to final consumers.

In this environment, the absence of limits on crossed participation, based on the concern that it could hamper investments in a context of low maturity in the domestic gas industry was an obstacle to competition.

This is because the owners of pipeline facilities had their own business interests, which were not always compatible with those of transporters / traders interested in using that infrastructure, especially where there was competition in the up–stream and down–stream segments. In this case, since the carrier has a majority share in the transportation company, it will seek to hinder or hamper competitors' pipeline access in order to strengthen its own strategic position in this competitive segment both up–stream and down–stream.

Otherwise, if transporters truly acted independently, their economic rationale would be towards maximizing network capacity use by allowing and even encouraging third–party access wherever there were available or idle capacity.

However, the behaviour or the dominant carrier in the sector –Petrobras– enables it to exercise its predominance over pipeline infrastructure ownership and seek to raise barriers to the entry of new actors in natural gas supply, for the purpose of protecting and increasing its interest in protecting its market.

Out of a total of 12 (twelve) transporters that were established, 6 (six) were structured with a majority shareholding by PETROBRAS, and 3 (three) with up to 50 % of the capital stock for that State–owned company, as seen in Table 8 below:

Table 8

Capital Structure in the Gas Transportation Sector

Shareholding	No. of Transporters	Transportation Companies
With 100 % PETROBRAS shareholding	5	TNS / TRANSPETRO / TAG / TCG / GASENE
With a majority PETROBRAS shareholding	1	TBG
With up to 50 % PETROBRAS shareholding	3	TMN / TNG / TSB
Without PETROBRAS shareholding	3	GASOCIDENTE / NTN / NTS

Total	12	

Source: ANP

5.3 Tariff Criteria Applicable to Transportation

ANP Resolution No. 29 of 2005 established the criteria for calculating natural gas pipeline tariffs, which cannot include discriminatory or preferential treatment among users. These tariffs, applicable to any type of natural gas transportation service, should be reported to the ANP and released to the market.

Tariffs on each service and/or carrier should be made up of a charge structure related to the nature of the costs that can be attributed to their provision, including: (i) costs of efficient service provision; and (ii) the cost determinants, such as the distance between the reception and delivery points, the volume and the contract duration.

In this way, the fixed transportation service tariff may be structured on the basis of the following charges:

(i) Charge for input capacity: Meant to cover fixed costs relating to receiving capacity and fixed costs relating to transportation capacity regardless of distance;
(ii) Charge for transportation capacity: Meant to cover fixed costs relating to transportation capacity depending on distance;
(iii) Charge for output capacity: Meant to cover fixed costs relating to delivery capacity;
(iv) Charge for movement: Meant to cover costs that vary with gas movement;

The STI tariff may be structured around a single volumetric charge applicable to the amount of gas that is actually mobilized. It is important for the interruptible tariff level to be established based on the probability of an interruption and the relative quality of this service in relation to the STF.

Tariffs proposed for services other than the STF and STI also use the STF tariff as a reference, being the primary service offered by the transporter. This procedure makes it possible to avoid the risk of predatory competition between the different service types.

As explained above, although the ANP is not authorized to establish access tariffs on transportation pipelines, except for cases that present divergence among the agents involved, this agency should see whether the value agreed on by the parties is compatible with the market.

5.4 Interface and regulatory issues between the natural gas and power industries

Natural gas pipeline transportation, similarly to electricity transmission, constitutes an important infrastructure of public interest and has the characteristics of a natural monopoly.

With regard to the regulatory problems that arise from the interface between the natural gas and power industries, a few important points should be highlighted: (i) the growing importance of thermoelectric generation with natural gas, due to expectations of accelerated economic growth and delays in implementing new hydroelectric projects; (ii) the need, identified by the government, to establish a mechanism that will make it possible to ensure natural gas supply for thermoelectric generation, prioritizing this consumption in order to avoid compromising the power supply; (iii) the reduced number of thermoelectric plants that currently have a fixed supply natural gas contract with Petrobras (notably the “Norte Fluminense” thermoelectric plant and the “Juiz de Fora" thermoelectric plant). By contract and due to the scarcity of this energy product, Petrobras has prioritized the gas demand of these plants; (iv) ANEEL Resolution No. 237 of 2006 establishes the criteria for considering thermoelectric plants when developing the *Programa Mensal de Operação Eletroenergética* (PMO) in cases of shutdown due to lack of fuel.

The findings of the most recent simultaneous operation test are of interest to demonstrate this interrelationship and the issues involved in the process. Its purpose was to verify natural gas availability for simultaneous dispatch to 13 thermoelectric plants at full capacity in December 2006, for plants located in the sub–markets of the Southern and South–Eastern / Central–Western regions.

5.5 Obstacles of the Regulatory Framework for Distribution

Until mid 2007, the federal government had not prepared any type of regulatory framework to discipline State concessions for natural gas distribution. The legal interpretation of Amendment No. 5 of the Federal Constitution that has prevailed until now is that when the power to license distribution activities was passed to the States of the Federation, it also included the prerogative to develop regulations to govern those activities.

Although it is not directly regulated, the Federal Government has a role in designing Brazil’s gas distribution model. In 1993, the Ministry of Mines and Energy signed a memorandum of understanding with the State Energy Secretariats. Through this memorandum, the States of the Federation granted concessions for the distribution segment to public or mixed companies (meaning with State Government participation – Petrobras and a private partner). These concession contracts were formalized between 1994 and 1996, and all State distributors signed the same concession contract.

There are three basic types of concession contracts for gas distribution in effect in Brazil: the contract of CEG and *CEG–Rio*, in the State of *Rio de Janeiro*; the contracts of the São Paulo distributors; and finally the contracts signed for all other distributors. All of the distributors in the country maintain exclusivity throughout the market for a period ranging from a minimum of 10 years to a maximum of 50

years. Under these contracts, only the distributors themselves can sell contracts to supply gas to final consumers within their concession areas.

Few specific regulatory efforts have been made in most States, meaning that practically the entire regulatory framework is contained within the concession contract itself. The States of *Rio de Janeiro* and *São Paulo* opted to privatize their respective gas distribution companies in 1998 and 1999, respectively. For these privatization processes, a new concession contract was negotiated for public bidding by the companies acting in the new concession areas. Thus, the regulatory frameworks for distribution in these two states differ from concession contracts signed by distributors in the other States of the Federation.

In addition to the rules stipulated in concession contracts, the state of *São Paulo* was the only one that made an effort to regulate the activity. This State created a specific regulatory agency for the energy sector – the *Comissão de Serviços Públicos de Energia* (CSPE) – which has been developing resolutions aimed to govern the distribution activity and further clarify the regulatory framework. Within the regulatory framework implemented by the CSPE, there is a provision to develop the interruptible market, in addition to the possibility for a distributor to resume take–or–pay contracts with customers who do not consume, changing them to interruptible consumers.

In addition to the possibility of resuming gas contracts, the regulatory framework for gas in *São Paulo* provides for the figure of free consumer. The large industrial and thermoelectric consumers may choose their gas suppliers, who will have free access to the distribution infrastructure, as of the twelfth year of the concession. In the case of Comgás, this should happen in 2011. Until that date, the CSPE should develop rulings governing free access in distribution.

In the same way, the concession contract in the state of *Rio de Janeiro* foresees the existence of free consumers as of the tenth year of the concession. This clause of the contract should become effective in 2007. This same concession contract stipulates that a consumer who chooses another supplier should continue paying the distributor the margin that it paid in the period prior to choosing that supplier. In other words, the contract does not say that the State regulatory agency, in this case the *Agência Reguladora de Energia e Saneamento Básico do Rio de Janeiro* (AGENERSA),[1] should set a new margin to cover gas transportation services solely from the city–gate to the final consumer. Thus, consumers who wish to change suppliers have to deal with a double gas distribution margin (that of the new supplier and that of CEG or CEG–Rio).

With regard to concession contracts in other States, there is no provision for free consumers. If the model for the Brazilian natural gas industry contemplated this type of consumer, it would be mandatory to amend the concession contracts that are currently in effect.

Presently, there is still much uncertainty as to the line separating Federal and State regulatory responsibility. In order to make progress in this direction, it would be necessary to seek legal and regulatory answers to the following questions:

1. Scope of the Union's regulatory powers. That is, it should attempt to establish whether there are any legal impediments for the Union to develop disciplinary norms for the distribution segment, despite the fact that it does not have power to grant concessions.[1]

2. It should also clarify whether to include local piped gas services; that is, define of what types of gas transportation pipeline services should be considered local services. In addition, it should also clarify whether other forms of gas transportation services (liquefied and compressed gas transportation via trucks and trains, for example) might be subject to State regulation.

It is clear, then, that the regulatory framework for the distribution segment represents an obstacle to the development of a more competitive gas market, as well as to the adoption of contractual mechanisms to enable greater demand flexibility. In order to move forward in the creation of a new regulatory framework for the gas distribution segment, it is important to clearly establish the Federal Union's role in the sector. The important presence of Petrobras still stands out in the capital makeup of most State gas distributors (Graph 1).

GRAPH 1 – BRAZILIAN NATURAL GAS DISTRIBUTORS

DISTRIBUTION COMPANY	CONCESSION AREA	VOTING STOCK HOLDINGS
Northern Region		
CIGÁS – *Companhia de Gás do Amazonas* (*)	State of Amazonas	51 % State 49 % CS Shares
RONGÁS – *Companhia Rondoniense de Gás S.A.* (*)	State of Rondônia	51 % State 24.5 % Gaspetro 24.5 % Termogás
Northern Region		
ALGÁS – *Gás de Alagoas S.A.*	State of Alagoas	51 % State 24.5 % Gaspetro 24.5 % Mitsui
BAHIAGÁS – *Companhia de Gás da Bahia*	State of Bahia	51 % State 24.5 % Gaspetro 24.5 %[1] Mitsui
CEGÁS – *Companhia de Gás do Ceará*	State of Ceará	51 % State 24.5 % Gaspetro 24.5 % Textilia S/A
COPERGÁS – *Companhia Pernambucana de Gás*	State of Pernambuco	51 % State 24.5 % Gaspetro 24.5 % Mitsui
GASMAR – *Companhia Maranhense de Gás* (*)	State of Maranhão	51 % State 28 % CS Shares

		21 % Gaspetro
GASPISA – *Companhia de Gás do Piauí* (*)	State of Piauí	51 % State 24.5 % CS Shares 24.5 % Gaspetro
PBGÁS – *Companhia Paraibana de Gás*	State of Paraíba	51 % State 24.5 % Gaspetro 24.5 % Mitsui
POTIGÁS – *Companhia Potiguar de Gás*	State of *Rio Grande do Norte*	51 % State 49 % Gaspetro
SERGÁS – *Sergipe Gás S.A.*	State of Sergipe	51 % State 24.5 % Gaspetro 24.5 % Mitsui
Central–Western Region		
CEBGÁS – *Companhia Brasiliense de Gás* (*)	Federal District	51 % CEB 28 % Brasiliagás 21 % Gaspetro
GOIASGÁS – *Agência Goiana de Gás Canalizado* (*)	State of Goiás	51 % State 29.5 % *Gasgoiano S/A* 19.5 % Gaspetro
MSGÁS – *Companhia de Gás do Mato Grosso do Sul*	State of *Mato Grosso do Sul*	51 % State 49 % Gaspetro
Northern Region		
BR Distribuidora S.A.	State of *Espírito Santo*	100 % *BR Distribuidora*
CEG – *Companhia Gas Distribuidora do Rio de Janeiro*	Metropolitan Area of the State of *Rio de Janeiro*	54.16 % *Natural gas* 34.56 % BNDESPAR 8.74 % *Dinâmica Energia* 2.26 % Pluspetrol 0.28 % Others
CEG RIO S.A.	Regions: *Norte Fluminense*, *Noroeste Fluminense*, *Baixadas Litorânea*, *Serrana*, *Médio Paraíba*, *Centro–Sul*, and *Baía da Ilha Grande*; entire State of *Rio de Janeiro*	70.46 % *Natural gas* 26.19 % Gaspetro 3.35 % Pluspetrol
COMGÁS – *Companhia de Gás de São Paulo*	Metropolitan Region of the State of *São Paulo*, and the Administrative Regions of *Campinas*, *Santos*, and *São José dos Campos*	71.9 % *Integral Investments BV* 6.3 % Shell 21.8 % Others
GÁS BRASILIANO DISTRIBUIDORA S.A.	Northeast of the State of *São Paulo*	51 % ENI 49 % *Italgás*
GASMIG – *Companhia de Gás de Minas Gerais*	State of Minas Gerais	50.8 % Cemig 40 % Gaspetro 7.9 % *MG Participações S/A* 1.3 % Municipality of BH
NATURAL GAS SÃO PAULO SUL S.A.	South of the State of *São Paulo*, covering 93 municipalities	100 % *Natural Gas SDG*
Northern Region		

COMPAGÁS – *Companhia Paranaense de Gás*	State of Paraná	51 % *Copel Participações S/A* 24.5 % Gaspetro 24.5 % Mitsui
SCGÁS – *Companhia de Gás de Santa Catarina*	State of Santa Catarina	51 % State 23 % Gaspetro 23 % Mitsui 3 % Infragas
SULGÁS – *Companhia de Gás do Estado do Rio Grande do Sul*	State of *Rio Grande do Sul*	51 % State 49 % Gaspetro

Source: ANP

5.6 The Search for a Specific Legal Framework: A Proposed Gas Law

In Brazil, the contracts used throughout the gas chain are essentially inflexible. The main contractual forms used are long–term contracts with *ship–or–pay* and *take–or–pay* clauses. These contracts do not allow frequent gas price adjustments according to its price variations on the market. Where gas prices to the final consumer fail to reflect its true value, gas demand expansion tends to be faster in times of greater competitiveness and slower in times of less competitiveness.

In this context, contractual instruments should allow flexibility for the gas price to vary, seeking to maintain its competitiveness vis–à–vis competing fuels. Contractual mechanisms should allow for variable margins and changes in the distribution of gas returns, so that prices and tariffs reflect the economic value of gas at all times.

We should point out that in the case of markets were gas competes with petroleum derivatives, gas prices vary along with the international oil and exchange markets. Under these circumstances, long–term contracts could ensure gas price alignment, as it would include transportation costs plus the price for this commodity. While international oil prices can be indexed, the transportation and distribution portions follow specific readjustment rules.

Another argument for flexibility is the strong presence of hydropower. Let us not forget that Brazil's hydroelectric generation capacity does not depend solely on installed capacity, but also the amount of water stored in the reservoirs. One peculiarity of the Brazil's hydroelectric system is the size of its reservoirs, since the Brazilian hydropower industry has the largest reservoirs in the world. This storage capacity enables it to collect water and significantly raise the capacity of its hydroelectric turbines. In this way, those turbines are capable of an energy production that can meet the needs of almost the entire power market at lower costs. Therefore, in periods of enough rain, the economic value of gas in the thermoelectric generation sector is substantially lower, and in extreme cases could even reach zero.

Brazil's natural gas industry has a few important characteristics on the supply side that imply high costs for offering flexibility. These characteristics are:

1. No storage capacity has been developed aside from that of the pipelines themselves.
2. Nearly 75 % of all domestic production comes from associated gas fields. Therefore, variations in gas production would impact oil production, in order to attend to the need for flexibility in the thermoelectric generation sector.
3. Practically all associated gas production, and 60 % of non–associated gas production, comes from *offshore* reservoirs. Even the recently–discovered gas reserves in *Bacia de Santos*, despite being non–associated gas, has a high opportunity cost due to the significant investments required to develop

these *offshore* reservoirs and the gas liquids that would not be produced during low production periods.[1]

4. The relevant onshore production of non–associated gas is found basically in the remote Amazon region system, and cannot compensate for demand variations in the North–eastern or Central Southern regions of the country.

5. The growth in natural gas imports from Bolivia implies a number of uncertainty factors on the political and economic scale, and this has lead Brazil to try and diversify the sources of imported natural gas supply, notably by developing an investment program to receive LNG.

The above characteristics make it advisable to seek greater flexibility on the demand side, as this would tend to lower costs for gas consumers. Therefore, it is necessary to develop forms of industrial organization and contractual devices to make greater flexibility viable. The challenge posed for the Brazilian regulatory framework is precisely having to innovate in the search for enhanced equilibrium between the needs for flexibility and for reducing investment risks.

The Brazilian Congress is currently debating Draft Law No. 6,673 of 2006, which would constitute a specific regulation for natural gas. The need for a specific legal framework is due to a series of issues arising with the growth of Brazil's gas industry, which have no legal backing within the scope of Law 9.478 of 1997.

Under this law, natural gas is not treated as a competitive primary energy source, but as a petroleum derivative. Furthermore, this legal framework does not set clear policy guidelines for the sector, nor does it offer suitable instruments for regulating transportation activities (a natural monopoly), aside from obstructing the implementation of a competitive model and increasing the perception of risk by all members of this value chain.

The lack of clearer policy directives for the sector – explicit in the natural gas limitations contained in Law No. 9,478 – leaves weighty decisions to be made through regulatory resolutions and decrees, with no consideration for the strategic vision that should permeate all decision–making in a sector of such vital importance to the country's energy matrix.

Therefore, we should emphasize that the Oil Law fails to contemplate certain important points for developing Brazil's natural gas industry. These matters are deemed essential to the regulatory process and to strengthen the regulatory agency and its duties, which were not specifically stated in the Law creating the ANP. The absence of these elements makes it difficult for the agency to perform its regulatory duties, as it lacks some of the legal instruments needed to regulate the sector, specifically in the natural gas industry, in order to achieve the model that is implicit in Law No. 9,478 of 1997 for the functioning of the sector. The primary points that are neglected in the Oil Law include:

(a) The ability to demand the legal, accounting and corporate separation of the activities making up the natural gas chain;

(b) The possibility to set limits on the crossed participation of economic agents and/or groups;

(c) The demand of prior approval by the ANP of all contracts relating to natural gas activities that are regulated by the Agency;

(d) Definition of regulatory jurisdiction between Federal and State regulations;

(e) Establishment of the unprofitable gas percentage;

(f) Setting time periods and calendars for flare reduction;

(g) The possibility for PETROBRAS to create natural gas transportation companies;

(h) The requirement that transportation operators be holders of the assets they operate;

(i) The establishment by the ANP of access tariffs to the natural gas transportation networks;

(j) The establishment of priorities in meeting natural gas demand (dispatch criteria);

(k) Gradual freeing of final consumers.

6. IMPACTS OF THE NEW REGULATORY FRAMEWORK ON THE OIL & GAS INDUSTRY AND COMPANIES

The opening process produced extremely positive results for Petrobras, aided by the growing domestic market and high oil prices, as well as the company's vertical structure. The latter, along with the barriers to enter the refining industry and the incipient development of new production fields, explains the fact that foreign countries present in Brazil's oil & gas industry have still hot achieved comparative results.

Petrobras is a mixed (public–private), open capital stock company that is controlled by the Federal Government (51 %), which acts in a vertically integrated way at all stages of the oil chain. The company specializes in the following segments of the oil, gas and energy industry: exploration and production, refining, marketing, transportation, petrochemical, and products distribution. Created in October 1953, today it is the 14th largest oil company in the world, according to data published in the *Petroleum Intelligence Weekly.*

Following the reform of Brazil's oil & gas industry, despite the entry of new players with the opening of Brazil's oil & gas industry, Petrobras still holds the dominant position. As mentioned above, this State–owned company is the "great victor" of the competitive bidding rounds and is responsible for practically all petroleum production in the country. In addition, it has a monopoly over the transportation segment and holds nearly 98 % of the refining capacity. In distribution, as shown below, the subsidiary company *BR Distributor* is the leader of the segment, but it competes for slices of the market with other distributors.

With regard to natural gas, this company is currently responsible for nearly 96 % of all domestic production and 90 % of all gas imports. In addition, it holds practically all internal transportation infrastructure. With regard to distribution, Petrobras holds shares in 20 of the 26 State piped gas distribution companies. On the demand side, it participates in many projects to build thermoelectric and cogeneration plants.

This data reveals that the review of Petrobras' performance is fairly representative of the situation throughout Brazil's oil & gas industry, except for the products distribution segment. For this reason, we chose to present data on the sector's evolution and Petrobras' performance in the same section. The case of the distribution segment will be highlighted further on.

At the 2012 horizon, Petrobras expects to consolidate its competitive advantages in the domestic market for oil and petroleum derivatives (Petrobras Strategic Plan), by intensifying its technological program for deep and ultra–deep offshore production systems, thus providing continuity for the following directives: i) expand reserves and production; ii) preserve leadership in offshore activities in deep and ultra–deep waters; iii) retain leadership in the Brazilian market for petroleum derivatives; and iv) prioritize integrated actions and logistics training.

Tables 9 and 10 below show the evolution of production and of proven reserves of domestic oil and natural gas over the past 10 years. One can see that during the period covered – from 1995 to 2005 – both oil & gas more than doubled, by 137 % and 119 %, respectively. Likewise, both fuels have increased their proven reserves – in the case of oil, growth was 96 %, while natural gas reserves rose 47 %.

Existing reserves and new areas mapped after public contests for blocks are the main scenario for domestic expansion of Petrobras and the other consortia and operators. Furthermore, these areas define the importance of deep offshore technological leadership as a decisive variable for current and future activities of the company. The significant increase in reserves enhanced the probabilities of a rapid rise in the country's oil and natural gas production, allowing Petrobras to become more competitive, reducing Brazil's energy vulnerability, avoiding high foreign exchange expenses for oil imports, and reducing the country's supply costs.

The greater production is a result of both Petrobras' investments in exploration and production – more than half are for these activities (see Table 11 and Graph 3) – and the entry of new agents in that segment of the oil industry.

Opening the up–stream segment could result, on the medium and long term, in the discovery of more oil and gas reserves as the initial investment programs for exploration in areas awarded during the first oil block rounds begin bearing fruits. Should this hypothesis be confirmed, an improvement of the Reserve / Production indicator could also be expected.

Table 9 – Domestic Oil Production and Proven Reserves

	RESERVES	PRODUCTION	R/P
	MM of barrels	MM of barrels	Years
1995	6,223	252	25
1996	6,681	286	23
1997	7,106	306	23
1998	7,357	355	21
1999	8,153	401	20
2000	8,465	451	19
2001	8,496	472	18
2002	9,805	531	18
2003	10,602	546	19
2004	11,243	541	21
2005	11,773	596	20
2006	12,182	629	19

Source: ANP

Table 10 – Domestic Natural Gas Production and Proven Reserves

	Reserves	Production (MM cubic meters)			R/P (years)
	(MM cubic meters)	Associated	Non - Associated	Total	
1995	207,964	5,812	2,254	8,066	26
1996	223,562	6,431	2,737	9,167	24
1997	227,650	6,919	2,906	9,825	23
1998	225,944	7,933	2,854	10,788	21
1999	231,233	9,301	2,554	11,855	20
2000	220,999	10,775	2,508	13,283	17
2001	222,731	11,131	2,868	13,999	16
2002	244,547	12,091	3,434	15,525	16
2003	245,340	12,135	3,657	15,792	16
2004	326,084	12,981	3,990	16,971	19
2005	306,395	13,778	3,921	17,699	17

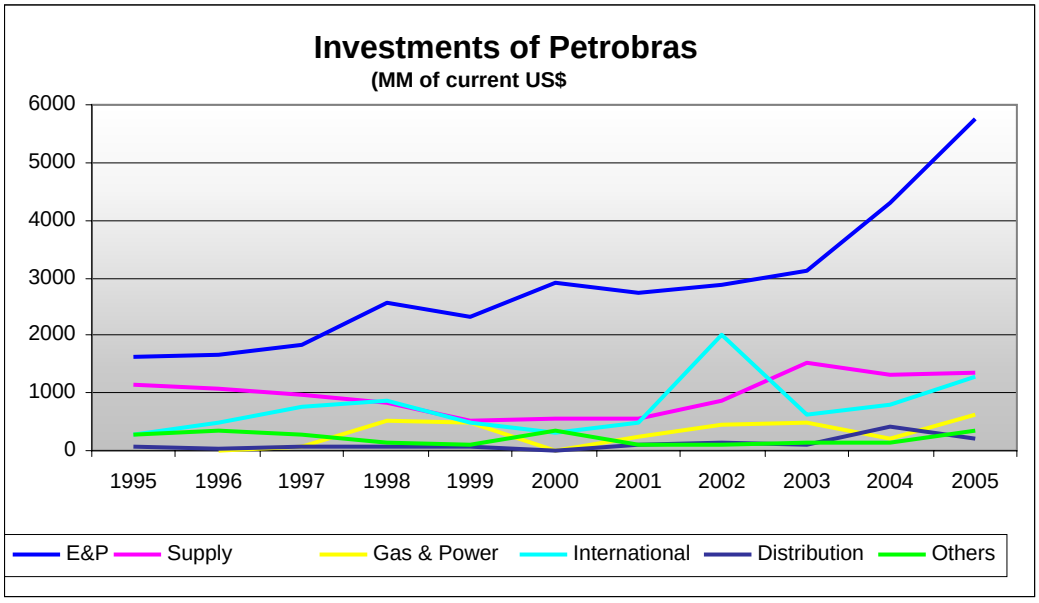
Source: ANP

Table 11 – Petrobras' Investments (in millions of US$)

	E&P	Supply	Gas & Power	International	Distribution	Others	Total
1995	1.628,0	1.147,0		263,0	81,0	271,0	3.390,0
1996	1.664,0	1.079,0	12,0	480,0	48,0	339,0	3.622,0
1997	1.849,0	955,0	78,0	766,0	81,0	280,0	4.009,0
1998	2.564,0	830,0	519,0	852,0	69,0	146,0	4.980,0
1999	2.316,0	532,0	501,0	469,0	63,0	96,0	3.977,0
2000	2.927,0	558,0	-	318,0	-	345,0	4.148,0
2001	2.723,0	561,0	231,0	500,0	92,0	120,0	4.227,0
2002	2.875,0	858,0	443,0	2.008,0	150,0	101,0	6.435,0
2003	3.110,0	1.533,0	472,0	640,0	108,0	149,0	6.012,0
2004	4.309,3	1.335,2	213,6	796,6	417,9	149,0	7.221,6
2005	5.758,1	1.349,0	627,0	1.297,0	203,0	346,0	9.580,1

Source: ANP

Graph 3



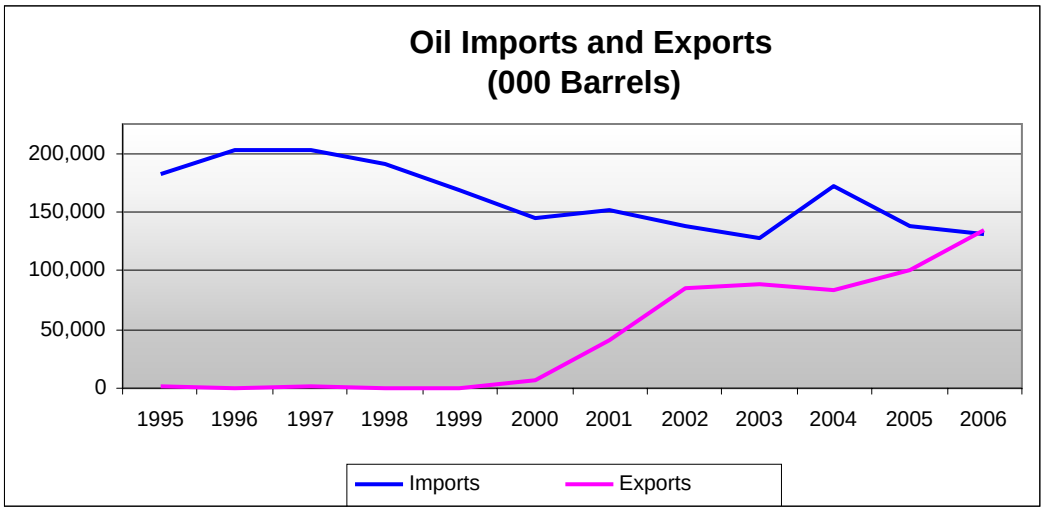
As a result of Petrobras' exploration and production efforts and the resulting growth in production, Table 12 shows a reduction of its dependency on foreign oil (see also Graph 4). This goal has been the common element of the Brazilian energy policy since oil was first struck, and has always been a priority of the different regimes that came into office in Brazil since then. Imports dropped 27 % between 1995 and 2006, from 182.5 to 131.9 million barrels. At the same time, a significant increase in exports was recorded for that period, leaping from 1.84 million barrels in 1995 to 134.34 million barrels in 2006.

Table 12 –Oil Imports and Exports

	Imports	Exports	Imports	Exports	Average Price Imported Oil	Average Price Exported Oil
	000 Barrels		000 US$ FOB		(US$/b)	(US$/b))
1995	182.548	1.837	2.951.466	n/d	16,17	n/d
1996	202.299	742	4.004.702	13.004	19,80	17,26
1997	202.049	931	3.731.093	17.104	18,47	18,35
1998	190.920	0	2.371.154	0	12,42	-
1999	169.254	204	2.812.432	1.525	16,62	7,49
2000	145.350	6.819	4.307.522	158.585	29,64	23,26
2001	152.481	40.434	3.978.037	720.871	26,09	17,83
2002	138.885	85.761	3.422.843	1.691.372	24,65	19,72
2003	128.213	88.246	3.918.965	2.121.930	30,57	24,05
2004	172.508	84.252	6.893.458	2.527.691	39,96	30,00
2005	138.468	100.190	7.661.484	4.164.450	55,33	41,57
2006	131.942	134.336	9.122.559	6.894.289	68,61	51,32

Source: ANP

Graph 4



Source: ANP

With regard to natural gas, the lack of transportation and distribution infrastructure gave this energy source a secondary role in comparison with the importance of oil in the Brazilian energy matrix.

However, although the natural gas industry is still incipient in Brazil, the share of gas in the energy matrix has been growing considerably. Between 1970 and 2006, the share of natural gas in the country's total primary energy supply went from nearly 2 % to approximately 10 %.

Table 13 below shows Brazil's natural gas imports. One can see a significant increase in imports of that fuel between 1999 and 2005, jumping from 400 million m^3

to approximately 9 billion m^3, which is a direct result of the expansion of the domestic natural gas market.

Table 13 –Natural Gas Imports

	Volume of Imports (000 cubic meters)			Imports Expenditures
	Argentina	Bolívia	Total	US$/000 cubic meter
1999	-	400	400	19
2000	106	2.105	2.211	184
2001	753	3.850	4.603	365
2002	492	4.777	5.269	425
2003	350	5.597	5.947	584
2004	451	7.635	8.086	785
2005	349	8.648	8.998	1.044

Source: ANP

Growth in natural gas consumption levels derived from such factors as increased gas demand for power generation, logistic infrastructure expansion, new large–size consumers entering in the market, and strong expansion on the VNG front.

As for the evolution of petroleum derivatives production, the data from Table 14 and Graph 5 show a rise between 1995 and 2005, at an average yearly rate of 4 %. Among the energy products, LPG had the most notable growth, at an average yearly rate of 6 %. On the other hand, lighting kerosene showed a significant lag between 1995 and 2005, at a negative average yearly growth rate of 34 %. The refining segment is heavily concentrated in Brazil. Despite the liberalization, Petrobras remains a *de facto* monopoly player (Table 15).

Table 14 – Energy and non–Energy Petroleum Derivatives (in thousands of m^3)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Energy Products	**63.247**	**61.857**	**69.817**	**75.603**	**76.570**	**77.681**	**83.486**	**81.909**	**82.737**	**88.176**	**89.510**
Gasoline A	14.643	15.220	17.818	19.591	18.364	18.576	19.930	19.407	18.537	18.583	19.978
Aviation gasoline	107	85	76	109	96	85	93	71	72	80	70
LPG	6.769	6.286	6.950	6.939	7.296	8.134	8.788	9.100	10.076	10.361	11.691
Fuel Oil	11.879	11.717	13.577	15.772	15.558	16.066	17.525	16.360	15.685	16.497	15.075
Diesel oil	26.527	25.229	27.862	29.351	31.447	30.780	33.078	32.991	34.153	38.252	38.396
Aviation fuel	0	3.195	3.439	3.765	3.722	3.744	3.714	3.625	3.792	4.142	4.118
kerosene	3.161	126	96	76	86	200	228	227	193	113	50
Others	161	-	-	-	-	94	130	128	230	147	130
Non - energy	**11.608**	**10.812**	**12.017**	**12.520**	**15.674**	**16.428**	**15.730**	**15.026**	**15.121**	**15.204**	**15.449**
Total	**74.854**	**72.669**	**81.835**	**88.123**	**92.243**	**94.109**	**99.216**	**96.935**	**97.858**	**103.380**	**104.959**

Source: ANP

Graph 5

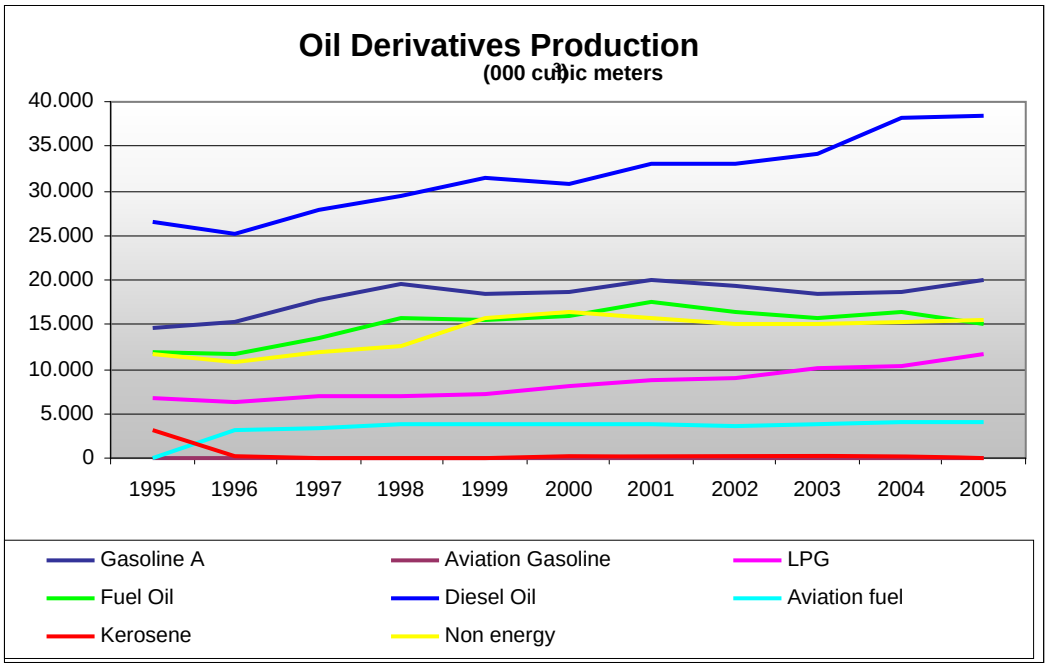


Table 15 – Petroleum Derivative Production by Refinery
(thousands of barrels)

	2000	2001	2002	2003	2004	2005	2006
IPIRANGA (RS)	5.077	5.251	4.711	5.953	4.287	1.990	2.651
LUBNOR (CE)	2.072	2.138	2.157	1.694	1.851	1.868	2.564
MANGUINHOS (RJ)	4.693	5.578	5.193	6.081	5.909	2.877	1.054
RECAP (SP)	14.109	16.754	15.019	15.200	16.913	13.842	15.962
REDUC (RJ)	66.726	67.619	71.827	73.661	82.150	82.788	82.753
REFAP (RS)	45.658	41.955	38.637	38.220	37.424	42.395	41.085
REGAP (MG)	46.047	47.568	46.624	46.965	49.605	49.499	51.130
REMAN (AM)	10.800	15.934	16.195	16.173	16.649	16.177	12.599
REPAR (PR)	66.008	69.168	68.880	68.271	59.010	67.209	66.490
REPLAN (SP)	125.220	130.092	126.399	110.922	128.453	125.036	132.115
REVAP (SP)	85.767	82.680	71.930	83.631	88.617	89.609	78.531
RLAM (BA)	60.881	73.749	75.224	69.975	86.881	91.851	96.743
RPBC (SP)	50.925	52.996	53.482	58.140	50.602	50.904	58.194
TOTAL	**583.982**	**611.483**	**596.279**	**594.888**	**628.353**	**636.047**	**641.873**
Market Shares							
Refineries of Petrobras	**98,3%**	**98,2%**	**98,3%**	**98,0%**	**98,4%**	**99,2%**	**99,4%**

Source: ANP

Table 16 and Graph 6 show that Brazil was a net importer of petroleum products until recently, became a net exporter as of 2003, and so remained until

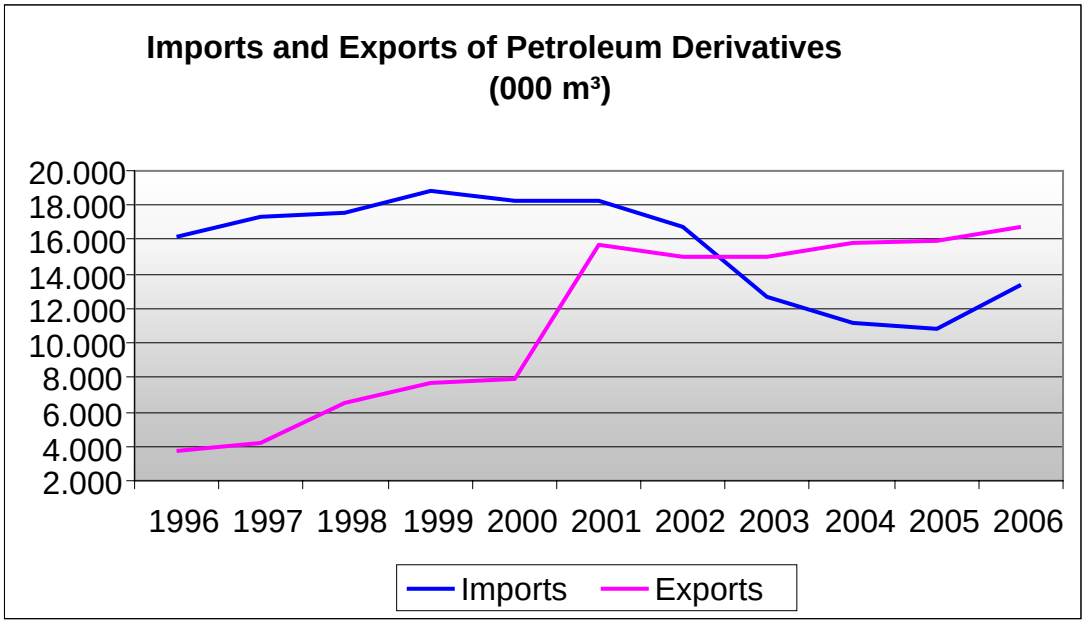
2006. This fact once again reflects a context of reduced foreign dependency for oil and petroleum products.

Table 16 – Imports and Exports of Petroleum Products

Year	Imports	Exports	X-M	Imports	Exports	X-M
	000 m³		000 m³	000 US$ FOB		000 US$ FOB
1996	16.118	3.763	(12.355)	2.135.630	494.772	(1.640.858)
1997	17.380	4.215	(13.166)	2.420.600	492.071	(1.928.529)
1998	17.555	6.538	(11.017)	1.695.571	548.349	(1.147.222)
1999	18.857	7.641	(11.215)	1.953.596	811.945	(1.141.651)
2000	18.229	7.878	(10.351)	3.225.564	1.854.038	(1.371.526)
2001	18.204	15.666	(2.538)	2.830.004	2.498.380	(331.624)
2002	16.780	15.013	(1.767)	2.389.564	2.271.585	(117.979)
2003	12.703	15.009	2.306	2.127.090	2.916.877	789.787
2004	11.139	15.796	4.657	2.494.948	3.447.635	952.687
2005	10.860	15.991	5.131	3.320.156	5.242.321	1.922.165
2006	13.414	16.775	3.361	4.923.972	6.411.745	1.487.773

Source: ANP

Graph 6

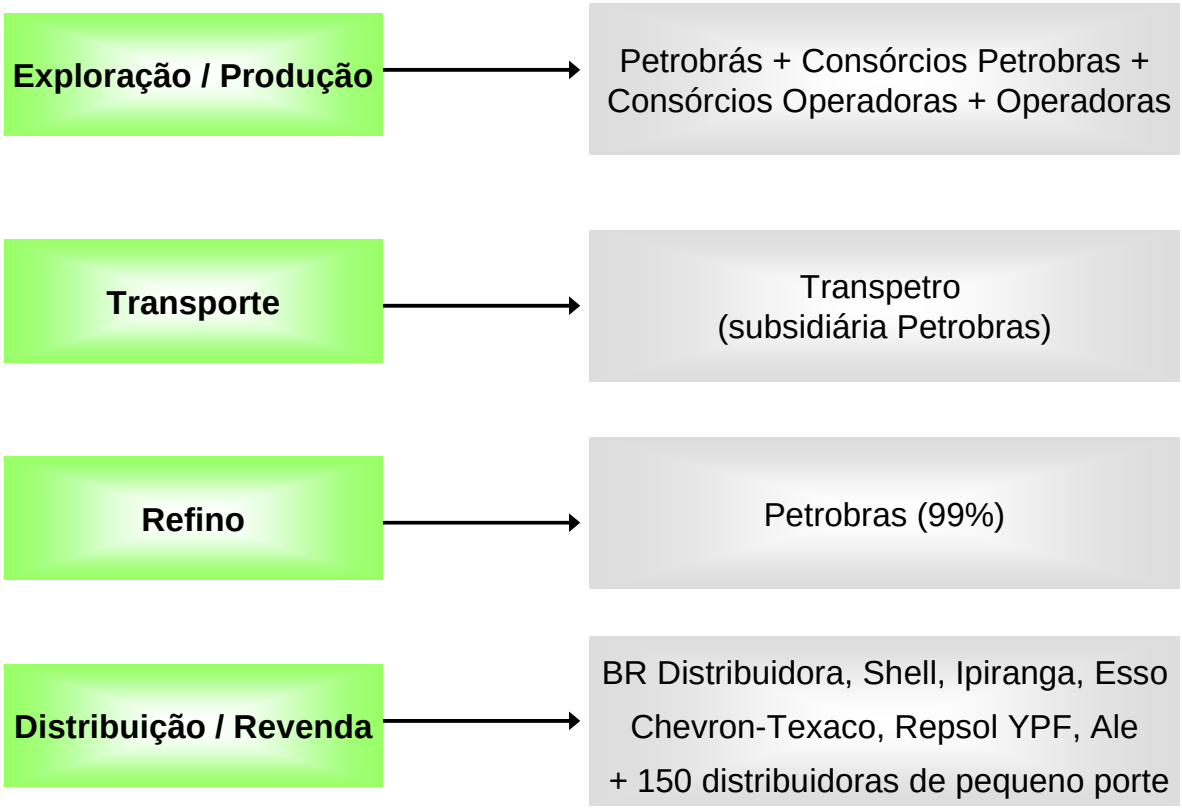


6.1. Economic–Financial Performance of Petrobras and its Growing Internationalization

Petrobras' business performance reveals great success following the opening, contrary to what some analysts foretold at the beginning of the reforms. Both receipts and net profits have grown as a result of the rise in production and oil

prices (Table 17 and Graph 17). The magnitude of these figures reflects the vertical presence of Petrobras at all stages of the oil chain, which has not occurred with the other competitors (Figure 6). These results also help explain the speedy process of company internationalization. This increase in earnings has facilitated the search for company growth through seeking new exploration areas and purchasing the assets of smaller companies (box 1).

Figure 6
Presence of Petrobras and Private Companies in Brazil's Oil and Derivatives Industry



Exploration / Production	Petrobras + Petrobras Consortia + Operators' Consortia + Operators
Transportation	Transpetro (Petrobras Subsidiary)
Refining	Petrobras (99%)
Distribution / Retail	BR Distribuidora, Shell, Ipiranga, Esso, Chevron-Texaco, Repsol YPF, Ale + small-scale distributors

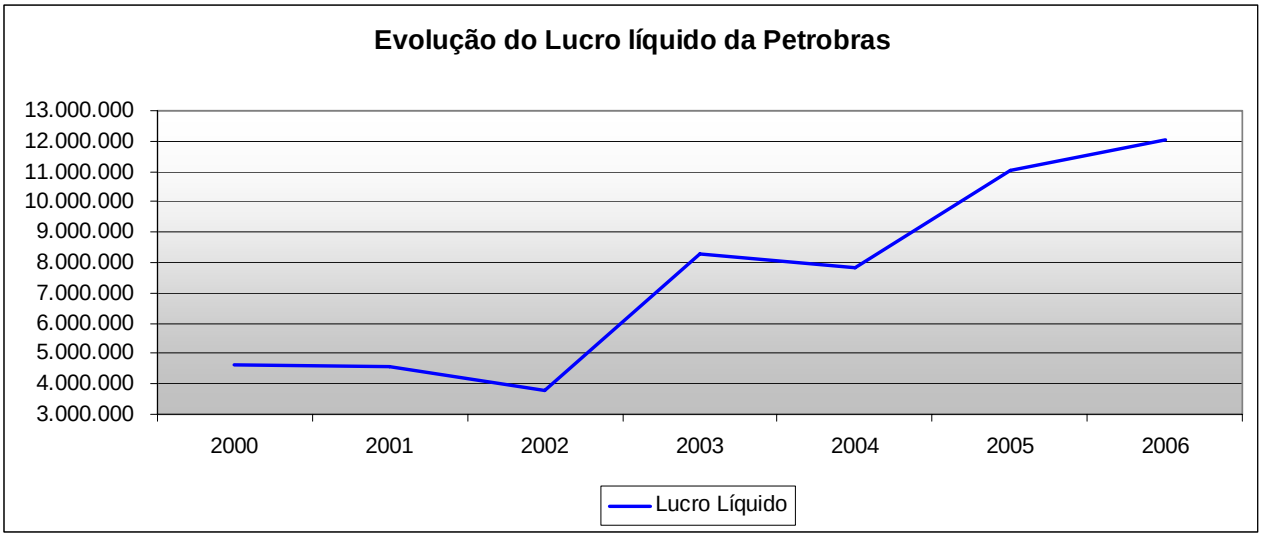
Table 17 – Petrobras' Economic–Financial Results (in thousands of US$)

Petrobras							
	2000	2001	2002	2003	2004	2005	2006
Receita Bruta	29.901.751	37.181.241	46.142.161	61.415.597	70.001.470	83.321.057	95.576.305
Receita Líquida	23.164.322	26.760.780	32.188.430	44.550.138	51.708.975	63.563.854	73.630.273
Lucro bruto	9.699.007	10.542.057	11.619.238	19.938.293	21.431.497	27.684.674	29.581.209
Lucro do exercício	4.626.305	4.591.242	3.767.992	8.280.056	7.857.893	11.039.376	12.060.360

Gross income
Net income
Gross profits
Profits for period
(Nota: Cambiar los separadores de miles a comas)

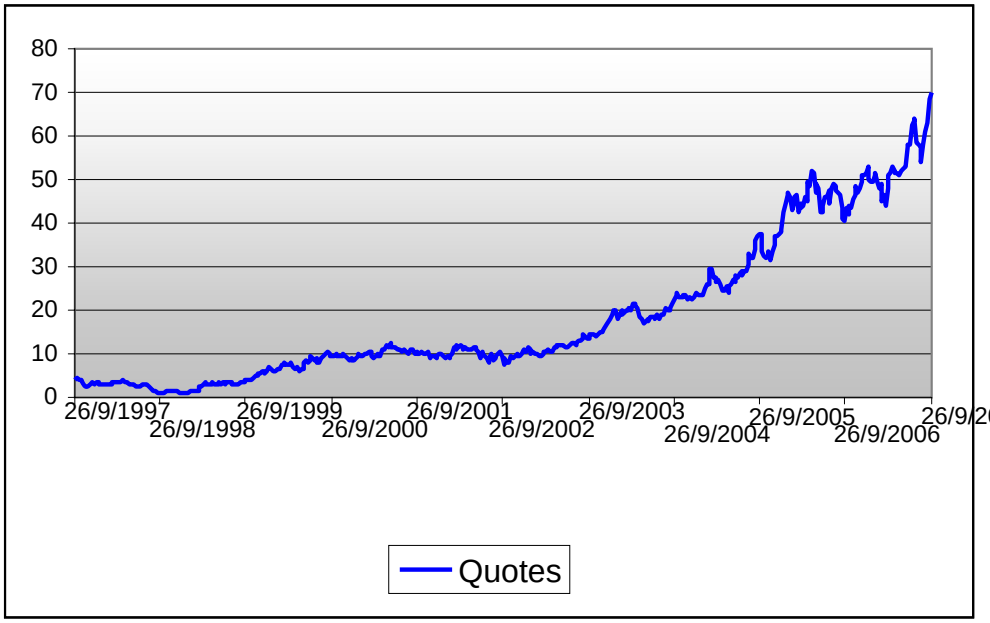
Graph 7 – Petrobras Net Earnings (in thousands of US$)

Petrobras - Evolution of Net Profits
Net Profits
(Nota: Cambiar los separadores de miles a comas)



Noteworthy also is the fact that these results reflect on the net worth of the company. Graph 8 shows the evolution of stock quotes over the past ten (10) years, just after Law No. 9478 was passed. The nominal value of shares multiplied nearly eighteen (18) times over the figures seen in 1997. This has attracted the interest of corporate and individual investors, both within Brazil and abroad, which in the financial sphere has helped consolidate Petrobras as an important player in international markets.

Graph 8 – Evolution of the Value of Petrobras' Stock: 1997–2007



Box 1 – Petrobras' Internationalization Process

Since the '70s, Petrobras has sought international insertion in the world oil industry. Until the early '90s, its primary international activities were carried out in Colombia, Angola and the United States. However, the inflection of the '90s was notable, with the company's entering Argentina, especially after the reform process began in 1995. From then on, Petrobras strongly expanded its portfolio of activities abroad.

Listed below in chronological order are the main relevant events of Petrobras' international activities.

1993: Argentina – start–up of operations in Argentina**.** Today Petrobras is vertically integrated and is one of the best oil & gas producers in the country. Its activities cover a broad range of assets and businesses in the fields of oil & gas exploration and production, commercialization, refining and processing, derivatives distribution, pipeline grids, petrochemistry, and power generation, distribution and transmission.

***1995*: Colombia –** Shares were purchased in the company Esso Colombiana Ltd. in five blocks, including three fields in production – Yaguará, *Rio Ceibas* and Arauca –, plus shareholdings in a few oil pipelines.

Bolívia – Creation of Petrobras Bolívia, with its effective start–up in 1996. Total investments in projects in which shares are held in that country reached nearly US$ 1 billion in the 1996–2004 period.

***1996*: Ecuador –** Operations began with oil exploration / production and oil pipeline transportation activities and businesses.

***1997*: Bolívia** – The Bolivia – Brazil gas pipeline construction began, to be completed in 2000.

***1998*: Colombia –** Purchase of the company Lasmo Oil Colombia Ltd., with reserves of 48 million BOE (barrels of oil equivalent) and shares in five blocks.

Nigeria – Activities began in Nigeria, in deep waters of the Niger River Delta.
***2000*: Colombia –** The Guando field was discovered in the Boquerón block, which is now in its production phase.
***2002:* Colombia –** Sale of all shares (42 %) in the Guepajé field.
***2003*: U.S.A.** – Oil was discovered in the Chinook and Saint Malo reservoirs.
Mexico – Beginning of activities as an operator in natural gas exploration and production service contracts in the on–land Cuervito and Fronteirizo blocks, in partnership with the Japanese Teikoku Oil and the Mexican *Dia Vaz*.
Venezuela – Beginning of activities through purchase of the Argentine company *Pérez Companc*, later changed to *Petrobras Energía S.A*. (PESA), performing activities of oil & gas exploration and production in areas in the East and West of the country.
***2004:* Nigeria –** Beginning of drilling operations in the OPL 324 block, first operated by Petrobras in deep waters off the Western coast of Africa.
Tanzania – A contract was signed with the State oil company Tanzania Petroleum Development Corporation (TPDC), which foresees exploration of Block 5 of the 9,450 km2 Mafia Basin in waters of 300 to 3,000 meters deep.
U.S.A. – Through *farm–ins*, the company acquired large exploratory prospects in deep American waters in the Gulf of Mexico, and also began to participate in the exploration of blocks for gas prospection in deep reservoirs with shallow waters. In April 2004, natural gas was discovered in the Coulomb North field located in Block MC 613, which in less than three months began to produce, taking advantage of adjacent production and drainage infrastructure.
Uruguay – Beginning of natural gas distribution activities in the interior of the country. It became a partner in the Uruguayan State company *Administración Nacional de Combustibles Alcohol y Portland* (ANCAP).
China – A strategic cooperation agreement was signed with the State company Sinopec, when a Petrobras office was inaugurated in China.
Iran – A contract was signed with the State–owned National Iranian Oil Company (NIOC), for exploring the Tusan block in the offshore sector of Iranian holdings in the Persian Gulf.
***2005:* Libya –** Petrobras was one of the awardees of the first bidding round for the State–owned National Oil Corporation of Libya (NOC). The company acquired the oil & gas exploratory rights and a share in the production of area 18, made up of four blocks with a total extension of 10,307 thousand km2.
Tanzania – The company participated in the third bidding round and was awarded the concession for Block 6, with a 100 % share.
Argentina – In January 2005, the companies Eg3, *Petrobras Argentina S.A*. and *Petrolera Santa Fé*, members of the Petrobras System in that country, merged to form *Petrobras Energia S.A*.
China – Formalization of a Memorandum of Understanding with the China National Petroleum Corporation (CNPC), to develop joint business with Petrobras in integrated activities of the sector, involving oil refining, pipeline transportation, exploration, and production, both on–land and offshore, in Brazil, China and other regions of the world.
***2006:* Colombia –** The average daily production achieved in May of that year was 50,700 bpd of oil.
Equatorial Guinea – Purchase of a 50 % share in the joint production contract for Block L.
Mozambique – Petrobras and the *Empresa Nacional de Hidrocarbonetos* (ENH), the

State company of Mozambique, signed a Memorandum of Understanding for oil and gas exploration in Mozambique, both on land and off–shore.
Paraguay – Beginning of operations in that country with the purchase of Shell's business as regards fuel operations (retail and commercial market).
Uruguay – Shell asset purchase completed, involving fuel distribution and commercialization operations. Consolidation of its presence in the Uruguayan natural gas area by completing the purchase of 51 % of the shares in *Gaseba Uruguay S.A.* (in July 2007 the company changed its name to *MontevideuGas*).
Turkey – Start–up of operations after obtaining the concession for two of the three blocks offered in the competitive bidding process for deep–water exploration and production in the Black Sea by the State oil company *Türkýye Petrollerý Anoným Ortaklidi* (TPAO) of Turkey.
***2007*: Senegal** – Purchase of a 40 % share in exploration of the Rufisque Profond block in waters ranging from 150 to 3,000 meters deep, covering an area of 7,294 km2.
India – A partnership agreement was signed with the company ONGC, the largest oil and gas company in India, and ONGC Videsh Limited (OVL), the international branch of that company. Six exploratory blocks will be operated in deep waters, two in Brazil and three on the Eastern Coast of India.
Pakistan – A contract was signed with Oil and Gas Development Company Limited (OGDCL), for the exploration of offshore block "G" in Pakistan, which is located offshore in the Indus Basin and is still fairly unexplored.
Portugal – An agreement was signed with *Galp Energia* and *Partex* for oil exploration and production in four blocks of the Lusitaniana Basin, located off the Portugal coast to the North of Lisbon.

6.2. Brazil's Oil & Gas Industry Reform and the Private Companies

The Brazilian oil & gas industry reform, as seen above, caused the entry of numerous new operators in the up–stream segment. However, the first results of the exploratory effort are just beginning to attain success, and recent statistics are still not informing these findings. One should note, however, that these companies are experiencing difficulties getting around the barriers to entering the refining segment, which keep them from benefitting from the economic advantages inherent in vertical integration. As mentioned above, without refining activities, these companies remain dependent on the strategic behaviour of Petrobras.

For these reasons, the following analysis examines the distribution segment, where the presence of private companies has always been important in Brazil.

Strictly speaking, one can observe a separate market structure for each of the petroleum derivatives. The markets for each oil product even show well–differentiated rates of demand growth (Table 18).

Table 18 – Domestic Sales to Distributors of Primary Oil Products (in thousands of m³) and Average Yearly Growth Rates: 1995–2005

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Annual Growth rate
Gasoline C	17.441	20.569	22.059	23.758	23.681	22.630	22.211	22.610	21.791	23.165	23.542	3,05
Aviation gasoline	63	67	76	81	76	76	71	63	59	61	55	-1,35
LPG	10.465	11.165	11.550	11.964	12.461	12.751	12.676	12.131	11.407	11.681	11.611	1,04
Fuel Oil	9.673	10.836	10.622	10.769	10.714	10.086	9.093	7.561	6.200	5.413	5.237	-5,95
Diesel Oil	28.444	30.155	31.999	34.350	34.720	35.151	37.025	37.668	36.853	39.219	39.137	3,24
Aviation fuel	3.703	4.024	4.497	4.997	4.566	4.333	4.818	4.436	3.972	4.209	4.430	1,81
Kerosene	169	144	108	93	100	145	202	201	177	116	59	-9,99
Total	**69.957**	**76.961**	**80.911**	**86.012**	**86.317**	**85.171**	**86.096**	**84.671**	**80.460**	**83.864**	**84.071**	**1,85**

Source: Self prepared based on ANP data.
Note: Includes the self–consumption of distributor companies.

Several non–economic factors also help explain the difficulties experienced by major private oil companies in the distribution segment. The progressive freeing up of wholesale and retail prices and margins was supported by new rules encouraging new companies to enter the distribution segment and compete with the established companies of the distribution oligopoly. The most important measures were: i) eliminating the requirement of minimum volumes per distributor; and ii) removing the mandatory marketing of products supplied by the distributor with the point–of–sale "flag" (trademark).

For the record, these changes were a result of a notable influx of new players (over 250 new distributors), on the one hand, and of fuel adulteration (primarily gasoline) and tax evasion, on the other. New (small) distributors initiated practices that lead to a judicial questioning of tax substitution mechanisms ("advance" tax collection at refineries) for paying contributions to the *Programa de Integração Social* (PIS), the *Seguridade Social* (COFINS) and the *Imposto de Circulação de Marketrias e Serviços* (ICMS), which ended with favourable judicial decisions.

New players' spurious cost reduction practices, such as fuel theft and adulteration, were meant to obtain immediate "competitive" gains vis–à–vis the advantages – particularly scale – of large, established dealers. Such practices posed inspection difficulties for the industry's new regulatory structure and required new measures of the ANP to restrict unfair competition by new players, namely: i) tightening control and monitoring of solvent sales and fuel quality at fuel retail posts; ii) requiring minimum storage capacities (750 thousand litres) and capital stock in order to receive an operating license from the ANP; and iii) revoking the unlimited permit to purchase fuel at the retail sites of any dealer – the permit was limited to "white flag" sites.

Despite the notable entry of new companies in the distribution segment (20 % of the total market), the 5 largest enterprises, *BR Distribuidora*, Ipiranga, Shell, Texaco, and Esso, concentrate the market for the principal derivatives.

As mentioned above, the current advantages of vertical integration explain the leadership of *BR Distribuidora*, a Petrobras subsidiary in the Brazilian derivatives distribution market, since large private distributors centre their actions on the distribution segment depending on prices and their relations with Petrobras in order to maintain or improve their market positions.

The cycle of introducing competitive pressures in the restructuring of Brazil's down–stream market ended with the regulatory effort to promote entry of new agents in derivative importing activities for aviation kerosene and LPG in 1998 (ANP Resolution No. 203 and No. 204), and for automobile gasoline and diesel oil in December 2001, following the creation of the CIDE. Meanwhile, the import business ran up against structural difficulties characteristic of Brazil's distribution activities, primarily the oligopolistic supply structure for the distribution of certain products, associated with the scale of a company's operations and the lack of storage and transportation facilities for imported products.

Those import barriers, especially those relating to available fuel transportation and storage infrastructure, are due to Brazil's derivatives supply and demand structure, which depends on the available refining capacity.

Despite the entry of new companies, the five largest distributors have significant market shares, which they have been able to maintain since the turn of the millennium, as illustrated on Table 19 for the gasoline, diesel and hydrated alcohol markets. It is also important to verify that Brazil's State–owned company retains its leadership of the fuel distribution market, and BR Distribuidora even increased its market power from 2001 to 2006 for the three fuels cited above.

The market share of these companies results from their experience and ability to control and manage different complementary assets that are fairly specific and that are strategically positioned to enable the continuity of supply flows (Table 18). Of note among these are having their own transportation capacity, exclusive supply contracts with retail networks, delivery contracts with large consumers and production units devoted to other petroleum derivatives (lubricants, additives and chemical components).

Table 19 – Fuel Distribution in Brazil and Degree of Concentration: Market Share (%)

Gasoline			Diesel			Hydrated Alcohol	
2001	**2006**		**2000**	**2006**		**2000**	**2006**
Petrobras	19,8	28,4	Petrobras	26,0	35,9	Petrobras	13,3	17,0
Grupo Ipiranga	15,0	17,4	Grupo Ipiranga	19,4	24,3	Grupo Ipiranga	10,8	13,1
Grupo Shell	12,0	6,3	Grupo Shell	12,4	7,1	Grupo Shell	7,8	5,3
Esso	12,3	9,5	Chevron Texaco	10,2	5,8	Texaco	5,8	4,1
Chevron Texaco	8,2	5,3	Esso	8,2	5,3	Esso	7,4	5,6
Repsol YPF	0,4	1,6	Repsol YPF	0,3	1,0	Repsol YPF	-	0,4
Ale	1,8	4,4	Satelite	0,7	2,0	Petronova	0,1	8,8
Others	34,0	27,1	Others	22,8	18,6	Tux	0,5	6,3
						Others	54,2	39,5
CR 5	**67,3**	**66,9**		**76,2**	**78,4**		**45,1**	**45,1**

Source: ANP

As for the performance of the private companies, it is noteworthy that some large companies such as *Esso do Brasil* closed their capital recently. This makes it hard to access economic and financial information. Table 19 shows the recent performance of two of the largest private distributors, Shell and Ipiranga. Note, however, that *Grupo Ipiranga* was purchased by a consortium made up of Petrobras, Braskem (petrochemicals) and Ultra (petrochemicals and derivatives

distribution) in March 2007. Shell faced serious difficulties early in the 2000 decade, due to a few market share losses, but since 2004 it has once again recorded profits. During that same period, Ipiranga achieved fairly interesting results. However, the recent acquisition of Ipiranga further strengthened the market power and dominant position of Petrobras in IBH.

Table 20
Economic and Financial Performance of *Shell do Brasil* and *Grupo Ipiranga* (in thousands of US$)

	2000		2001		2002		2003		2004		2005	
	Ipiranga	Shell	Ipiranga	Shell	Ipiranga	Shell	Ipiranga	Shell	Ipiranga	Shell	Ipiranga	Shell
Receita Bruta	3.410.531	3.891.663	4.254.612	4.350.603	4.893.962	4.759.732	6.656.333	5.761.144	7.551.488	6.808.977	9.127.613	7.830.464
Receita Líquida	3.316.469	3.559.128	4.159.540	4.144.272	4.794.729	4.416.004	6.466.880	5.337.874	7.349.541	6.321.805	8.883.239	7.265.917
Lucro bruto	190.517	287.452	253.519	410.248	340.274	397.616	322.019	389.493	392.783	720.338	440.630	688.799
Lucro do exercício	21.592	(14.502)	11.363	(7.824)	(31.981)	(58.492)	69.069	(294.119)	147.918	3.689	151.448	19.216

Gross income
Net income
Gross profits
Profits for period
(Nota: Cambiar los separadores de miles a comas)

7. LESSONS LEARNED AND MAIN CONSEQUENCES OF BRAZIL'S OIL & GAS INDUSTRY REFORM

Although the sector reform of 1995 was the central focus of the liberalization and opening of the oil sector to competition, Petrobras continued to be the dominant company of the Brazilian oil & gas industry. The impacts of imposing a regulatory framework on the State–oil company, with the introduction of competitive pressures, were quite positive: it forced the company to review its work approach, reorganize its competencies (technological, human resource and managerial), redesign its strategic planning according to the new economic environment, and expand its international insertion. Contrary to what many had imagined, the Brazilian reform strengthened Petrobras' position, both in Brazil and in the world oil sector.

As for the private companies, deregulation of the sector made it possible for new agents to enter the exploration and production business, and as yet their performance cannot be correctly assessed. In the distribution business, the performance of the two largest private distributors (Shell and Ipiranga) showed significant results as of 2004.

Some of the main aspects resulting from the opening process of Brazil's oil & gas industry deserve to be highlighted.

1. The mechanism of auctioning oil blocks substantiated the opening process and enabled the entry of dozens of operators in oil exploration e production, with

great transparency. Petrobras remains the major operating company and the awardee of most auctions, acting alone or in partnership with other companies. Nevertheless, it is undeniable that a new business environment has been created that enables new oil companies to act in the up–stream segment of Brazil's oil & gas industry. Current exploratory programs will soon begin to show results, in light of the investment programs that are being implemented.

2. Despite the entry of new players, the extent of Petrobras' dominant position throughout the country's oil production chain is a determining factor in ongoing cooperative strategies of large international players in the future evolution of Brazil's up–stream market, especially in sharing the technological know–how gathered by Petrobras in deep water off–shore exploration.

3. Petrobras was strengthened following the opening process. Fewer institutional restrictions on the company's domestic and foreign expansion, together with the oil price hike, enabled its business performance that is seen in a review of both its profits and the evolution of the company's stock prices. Performance of the up–stream sector was also highly satisfactory and its opening effectively enabled the entry of new operators. Furthermore, the country was able to meet the goal of oil self–sufficiency, pursued for many decades.

4. On the long–term horizon, Brazil will tend towards becoming one of the most promising regions for attracting up–stream investments and, at the limits, an exporting company competing with new, "more traditional" regions such as the Gulf of Mexico, Russia, Asia (especially Indonesia, China and the Philippines), and the West African coast (especially Nigeria, the Guinea Gulf, and Angola): the Brazilian coast is geologically similar to the West African coast and Brazil's sediment basins have been scarcely explored in relation to their size.

5. One of the main problems remaining is that it may cause problems for the private companies discovering oil, due to the price policy and Petrobras' dominant position in the refining segment. Being the owner of practically 100 % of the refineries, Petrobras can act as a monopolist and monopsonist, thus hampering the activities of competing companies. In this way, liberalization did not cause the same effects in reducing the new companies' barriers to entry and participation in all of the economic activities of the oil chain. Brazil's *Sistema de Defesa da Concorrência* has proven incapable of dealing with this problem. It is undeniable that Petrobras' political weight in governmental decisions is a factor that explains the lack of objective decisions as concerns Brazil's oil & gas industry on behalf of the Brazilian pro–competition agencies.

6. Although the *Política Energética Nacional* is officially the responsibility of the *Ministério de Minas e Energia* and is ratified within the scope of the *Conselho Nacional de Política Energética*, the future of up–stream activities is still not clear. The central issue is regarding the decisions to be taken with regard to Petrobras' role in increasing national production. Will Brazil become an oil exporter? This matter is directly related to what criteria will dominate the offering of new oil blocks to be put up for bids over the next two years.

7. Directly related to the above points is the role of the new oil companies. When exploration is commercially successful, production decisions under the current framework should be aimed towards exporting, since the centralized refining structure reduces the negotiating power of these companies in the domestic market.

8. With regard to the ANP's role, we must say that during its first years of activity, the agency had several clashes with Petrobras in its attempt to implement the provisions of Law No. 9478 of 1997, and was quite successful in organizing the entry process for new up–stream agents. The Brazilian model of competitive auctioning for oil blocks has become a referent for the international petroleum industry. However, over time the proactive activities of the ANP dropped off and the bidding process itself was heavily hit by last year's suspension of the eighth round. That event seriously affected the agency's credibility and placed a question mark on the improvement of the block auctioning model and on the next rounds.

9. Despite achieving self–sufficiency for oil, external dependency for natural gas continues to climb. Import problems reoriented Petrobras' natural gas supply strategy towards launching an investment program to develop the infrastructure needed to import LNG. Also of note is the *Plano Nacional de Antecipação de Gás*, implemented by Petrobras with a view to accelerating development programs for domestic production based on recent discoveries of new reserves, particularly in the *Campos, Santos*, and *Espírito Santo* basins.

10. The legal framework for the hydrocarbons industry should have contemplated in greater detail the specific questions of the gas industry. The gas sector's regulatory issues differ greatly from those found in the oil chain, as they include segments with natural monopoly characteristics (transportation and distribution). The interface between the gas industry and the power industry, due to the growing role of thermoelectric generation, further complicates this problem. This lesson is important because it shows that the legal framework instituted in 1997 was inadequate to address the regulatory issues of the gas industry. It is for this reason that the Brazilian Congress is debating a specific law for the gas industry.

Briefly, one could say that the reform of Brazil's oil & gas industry was successful in the up–stream sector, with transparent rules aimed to organize the entry process for new operators through the use of the competitive bidding mechanism for oil exploration blocks. The new "government take" structure greatly increased government revenues from the petroleum business for federal, state and municipal governments.

However, so far the conditions of competition in the down–stream segment have been strongly asymmetric. Petrobras' dominant, monopolistic refining position is an obstacle to the expansion of other companies in the different links of the oil and derivatives chain.

It is hard to foresee a change in this scenario on the medium term, since the Brazilian government placed its bets on gradualism in the liberalization process and on strengthening Petrobras, both on the domestic market and in the international arena. Therefore, it is not surprising to see the large number of strategic alliances established between new entries and Petrobras.

As for the natural gas industry, the legal framework of Law No. 9,478 of 1997 was totally inadequate to address contractual and regulatory issues. Objectively, although the general provisions of this law were anchored in the principle of free competition, the opening process had little impact on competition and the entry of new players.

Therefore, with regard to possible enhancements in current regulatory frameworks, one might say that in addition to revising a few specific resolutions and decrees through the institutionalized process of referendums and public hearings, it is worthwhile highlighting the gaps in the Oil Law in its treatment of natural gas.

As a crucial recommendation, it is important to underline the pre–eminence of the legal and regulatory framework for the Brazilian energy sector. This is due both to the fact that Law No. 9478 of 1997 does not offer a suitable instrument for regulating the gas industry, especially the transportation business deemed a natural monopoly, and the need to deal more consistently with matters regarding the interface between the gas and power sectors.

Accordingly, with a view to enabling better operation of public and private companies and more efficient action by the regulatory entity, it is necessary to fine tune the regulatory framework, which would primarily make it possible: (i) to demand separation – legal, accounting and corporate – of the activities making up the natural gas chain; (ii) to set limits on the crossed participation of economic agents and/or groups; (iii) to require prior approval by the ANP for contracts relating to natural gas activities that are regulated by this Agency; (iv) to define regulatory jurisdictions between federal and state regulations; (v) to establish the percentage of unusable gas; (vi) to set periods and timelines for flare reduction; (vii) for Petrobras to create natural gas transportation companies; (viii) to demand that operators of transportation activities be holders of the assets they operate; (ix) for the ANP to set access tariffs to natural gas transportation networks; (x) to establish priorities in meeting natural gas demands (dispatch criteria); and (xi) to gradually liberalize final consumers.

Finally, we should underline that it is indisputable that the long–term evolution of Brazil's oil & gas industry will depend on the strategic moves of Petrobras. Accordingly, the initial motive of attracting private investment became a secondary objective in practice. Aside from giving new operators more room to act, the clearest outcome of the opening process was transforming the management and expanding the national and international assets portfolio of Petrobras. For now, there is no sign of change in this privileged status achieved by Petrobras following the Brazilian oil & gas industry reform.

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