CEE CENTER FOR ENERGY ECONOMICS

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Case Study From

NEW ERA IN OIL, GAS & POWER VALUE CREATION

Brazil's Restructuring of the Oil and Gas Industry[1]

Brazil is a large and fast growing market for oil and gas. In 1995, oil consumption was 1.45 million barrels per day (MMbbl/d) and the oil production averaged about 890,000 bbl/d. Presently, the oil consumption is just under 2.0 MMbbl/d, while the production averages 1.3 MMbbl/d. Estimates for the next decade's consumption indicated a rate of increase of 4.5% a year, with consumption reaching 2.5 MMbbl/d in 2005.

Changes to the Brazilian constitution in 1995 and the passage of the Petroleum Law in 1997 led to the opening of the petroleum sector to private investment. Also, a new regulatory agency has been created. Several major and independent oil and gas companies have been active in Brazil since the 1997 law. The midstream and downstream sectors are undergoing a complete restructuring. There are, however, movements forward and retractions, glitches and uncertainties in regulations, and a period of adaptation for all companies that had been operating in the country prior to these changes.

- *What were the circumstances that induced Brazil to introduce private investment and competition in the petroleum industry that was traditionally dominated by a state monopoly?*
- *What has been the impact of state-owned Petrobras in this new environment?*
- *Have the results of this restructuring been beneficial for Brazil?*

[1] This case study was prepared using publicly available information.

Background

Brazil is the eighth largest economy and fifth most populous country in the world. It has a population of about 176 million, and an annual growth rate of 0.9 %. The Brazilian economy grew at double-digit annual growth rates in the late 1960s and early 1970s when the structure of the economy underwent rapid change. In the 1980s, however, the economic performance deteriorated. Annual GDP growth averaged only 1.5% between 1980 and 1993 while the country's inflation spiked. This reflected the economy's inability to respond to the second oil shock, increases in international real interest rates, the Latin American external debt crisis and the ensuing cutoff of foreign credit and foreign direct investment (FDI). This lack of responsiveness reflected the largely inward-looking policy orientation that had been in place since the 1960s.

Provisions in the 1988 Constitution, which introduced significant rigidities in budgeting and public expenditure, further impaired economic flexibility. As a result, the rate of inflation reached 50% per month by the middle of 1994. While widespread indexation limited the damage caused by such inflation, it also made reduction of inflation technically difficult to achieve.

Important reforms in liberalization of external trade and in developing a framework for privatization were introduced in the early 1990s. Building upon these initiatives, Brazil underwent a major change in economic regime with the introduction of the Real Plan in mid-1994, which was designed primarily to reduce inflation in a durable way. This was achieved through a managed exchange rate, de-indexation, structural reform and privatization. Consumer price inflation dropped sharply to only 2.7% in 1998, as compared to over 2,000% in 1994. This package of measures permitted a resumption of growth, reduction in poverty, and a significant increase in private capital, especially FDI. The Real Plan has raised the income of the poor through the elimination of the inflation tax and through higher real wages.

Nevertheless, high poverty levels and income distribution inequality remain serious. These problems are linked to wide disparities in regional development, education, health, land and capital assets, and public spending. Income per capita in the richest state (São Paulo) is more than seven times the income per capita in the poorest state (Piauí). About 33% of the population in the northeast is in poverty, compared with 11% in the richer southeast.

In 2001, Brazil experienced slower economic growth, as the country struggled with an electricity shortage problem. After difficult years in the late 1990s, the country's economy showed some recovery in 2002, with a 3.4% growth rate. Moreover, threats of default by Argentina and the recession in the U.S., Brazil's main trade partner, negatively affected the already vulnerable Brazilian economy. At the end of 2002, Brazil elected a new president Inacio 'Lula' da Silva from the socialist party. It is expected that Brazil will become more conservative and will impose some barriers to free trade but it is too soon to know, and so far the financial markets have received the new president with skepticism.

Energy Sector

Brazil is a net importer of oil and gas. Its oil imports come mostly from Venezuela and Argentina. In 2001, the country imported 600,000 bbl/d of oil. The demand for oil and its products has increased significantly in recent years from about 1.3 MMbbl/d in 1990 to 2.0 MMbbl/d in 2000. Production increased from 800,000 bbl/d to only 890,000 bbl/d in 1995 and to 1.5 mmbl/d between 1995 and 2000. Brazil has limited proved gas reserves and accordingly has been producing and consuming small amounts. Imports from Bolivia and Argentina will cause gas consumption to rise. The country consumes a fair amount of coal most of which is imported.

Fossil Fuel Reserves, Production and Consumption in Brazil (2001)

	Proved Reserves	Production	Consumption
Oil	1.2 billion t (8.5 billion b)	66 MT/yr (1.3 mb/d)	85 MT/yr (1.9 mb/d)
Natural Gas	220 bcm (7.8 tcf)	7.7 bcm/yr (700 MMcf/d)	11 bcm/yr(1100 MMcf/d)
Coal	11.9 billion short tons	5.8 million short tons	22.5 million short tons

Sources: Energy Information Administration (EIA), BP World Energy

The electricity system heavily depends on hydropower. Out of the country's total 65,200 MW of generation capacity, 57,000 MW are based on hydroelectric plants. The country has been trying to increase its thermal base, especially by introducing gas-fired power plants. In 2001, the country consumed about 354 TWh of electricity, but only generated 325 TWh, mostly from hydro sources. Such high dependence on hydro makes it difficult for the country to meet its power needs during dry years. As a result, Brazil has been importing 35 to 40 TWh of electricity per year in the late 1990s, accounting for more than 10% of its total consumption.

In 2000-01, due to several years of below-average rainfall, Brazil's hydro-dependent electricity sector was strained beyond capacity, leaving reservoirs about 30% full. The government has contemplated measures such as reducing the work day from eight to six hours and reducing the workweek from five days to four, in an effort to stretch the limited electricity supply. Predictions vary as to how long the crisis will last and how severe the economic impacts will be.

Petroleum Industry Restructuring

Following the general trend towards a more liberal economic policy, on November 1995, the Brazilian Congress passed a constitutional amendment modifying sub-items to Article 177 of the federal constitution. This modification created a new legal framework regarding the administration of the state's petroleum monopoly in the country. Until that time, the 1988 Constitution and Law 2.004 of 1953 had given Petrobras the exclusive rights to all of the upstream and most of the downstream activities in the country. The new constitutional amendment (No. 9) maintained the state's monopoly on these activities. However, instead of giving the administration to Petrobras, it created a new regulatory agency to be in charge of transferring these rights to private agents and Petrobras either through concessions or authorization, depending on the specific activity. This constitutional change marks the beginning of a new phase of the petroleum industry in Brazil.

The new regulatory agency, the National Petroleum Agency (ANP), oversees the dismantling of the government petroleum monopoly by cutting subsidies, extending new concessions and authorizations to the private sector (including foreigners), and establishing the new regulatory framework for the country. Among the activities of the ANP to date, four exploration and production licensing rounds have been conducted, regulation giving open access to pipelines in the country has been enacted, and several authorizations for transportation, import, and storage of hydrocarbons have been issued to private investors.

As of January 2002, Sebastiao do Rego Barros, ex ambassador to Argentina, replaced David Zylbersztajn as head of the ANP. Critics wonder whether this do Rego Barros will maintain the aggressive deregulatory stance that bolstered the agency's credibility under Zylbersztajn. Other criticisms regard Barros' qualifications, since the ex-ambassador does not have any experience in the industry.

Petrobras

The so-called "flexibilization" of the Brazilian petroleum sector caused a great deal of concern in the Brazilian society – so much so that, in 1996, President Fernando Henrique Cardoso committed before the Senate that Petrobras would remain in state hands. Accordingly, the company has not been privatized. Petrobras has no special rights and must compete on an equal footing with all other players in the market. One of the consequences of this "new competition status" is that Petrobras had to transfer to the ANP all nonproprietary data on the petroleum sector in Brazil (including geological and geophysical data). Almost all of this data is now in ANP's hands and is available to interested parties, through the newly created ANP Data Bank.

Although there were fears that Petrobras would have a difficult time operating in a competitive world, the latest company results point to a successful integration into this new environment. Petrobras is one of the world's largest petroleum companies, with total domestic and international oil and gas reserves of 9.3 billion barrels of oil equivalent (boe), as of 2001. Its daily average oil and gas production in 2001 was 1.5 mboe/d, most of which was produced offshore (969,000 boe/d). Petrobras operates 8,813 producing wells, 15,390 km of pipelines, 53 terminals, and 14 refineries with a nominal installed processing capacity of 1.953 MMbbl/d. As for financials, Petrobras consolidated results for the 2001 reporting period included gross operating revenues of $28.04 billion, net operating revenues of $24.549 billion, and a net profit of $3.491 billion. In January 2002, the company lost its monopoly on importing oil and refined products.

The Cardoso government has replaced and changed the legal composition of the Petrobras Board of Directors to help steer the company in this new era. The government has maintained its control over the direction of Petrobras by designating the Minister of Mines and Energy as the chairman of the company's Board. However, it is letting go of all shares above what is necessary to maintain a controlling interest – 50% plus one voting share.

Accordingly, the government recently put 28.48% of Petrobras's voting stock on the market. This corresponds to 16.63% of the company's total stock. A part of the Petrobras shares not under government control were offered in Brazil. Brazilian workers could opt for exchanging up to 50% of their Employees Indemnity Guarantee Fund (FGTS) for Petrobras stock. The operation attracted less that 10% of the FGTS funds allowed to be exchanged. Petrobras gained 150,000 new shareholders, and the operation resulted in the exchange of $555 million, which still was considered "a success, given the fact that it is a first experience," by the National Development Bank (BNDES). The offering generated more than $4 billion, and more than half of the shares were sold to foreign investors. The revenue was used to finance the company's debt and to invest in exploration. A secondary stock offering has been delayed. Complete privatization of the company is unlikely before the conclusion of President Cardoso's term in 2003.

As opposed to the relatively mild repercussions from this sale to Brazilian workers, the international launch of American Depositary Receipts (ADRs) last August was a great success and resulted in raising $2.5 billion for the government. Adding the FGTS-exchanged stock (Brazilian process) with the ADR sales (New York Stock Exchange process), the overall result was $4 billion raised in the sale of 28% of Petrobras voting capital.

In 1999, the government appointed a new president, Henri Philippe Reichstul, to guide the company through this radical change. Although Reichstul had no previous experience in the oil industry, he had plenty in government and finance. He has combined his financial experience and his new knowledge of the industry to design a new strategic plan for Petrobras. Included in this plan is the integration of Braspetro, the company's international arm, into the main company as a division headed by a director. This is a significant move, as it has changed the way Petrobras deals with partners. Today a new joint-venture partnership model is evolving – one that includes the swapping of participation in international E&P projects for participation interest in major development and production projects in Brazil. Finally, since 1998, Petrobras has been signing joint-venture agreements with several domestic and international players, sometimes as operator and other times as a simple participant.

Exploration and Production

One of the most important features of the new regime is the assignment of the country's oil fields. Technically, these fields have always been in the possession of the Federal Republic. In practice, Petrobras exercised these rights. Since the enactment of the new Petroleum Law in 1997, E&P rights in Brazil are to be granted through concession contracts, preceded by public tenders organized by the ANP. Today any company that complies with the technical, economic, and legal requirements established by the ANP may qualify to get concessions to explore for and produce petroleum. These concessionaires are entitled to all of the oil and gas produced, subject to applicable taxes and other government takes.

Petrobras was granted rights to all of its fields that were under production as of August 1998. In addition, in areas where Petrobras had commercial discoveries or significant investments in exploration, it was granted a three-year period to continue E&P activities and pursue commercial production. All properties that Petrobras had not put under production, declared unworthy of a continuing E&P effort, or failed to sufficiently finance, automatically reverted back to the government.

The government take in Brazil includes a signature bonus (minimum amount established in a public notice tender); royalties of 10% over gross production (occasionally reduced to a minimum of 5% in cases of higher geological risks); a "special participation" with variable percentages, if any, applied to the net revenue of the fields with large production or large productivity; and an annual rental fee assessed per square kilometer. Moreover, an extra royalty of 0.5 to 1.0% of production applies to onshore producers and is paid directly to the appropriate landowner. Then, the regular fiscal regime affecting all companies operating in Brazil is applied.

ANP's Round One for international bids took place in June 1999. The government collected roughly $140 million in bonuses during that round. Given the market conditions prevailing at that time, this round was considered fairly successful. Round Two took place in June 2000, and left the Brazilian government with about $200 million in bonuses. Round Three took place in June 2001, and was a success, leaving the Brazilian government with about $256 million in bonuses. The fourth round offered 39 offshore and 15 onshore blocks. Eight blocks were in "frontier areas", and six were in the Campos Basin. The average block size was considerably larger than those in the third round. The round was launched in October 2001, and 35 companies met the May 2002 bid deadline. The auction was held in June 2002, with Petrobras once again the largest winner. Statoil, El Paso, and several other companies increased their investments in Brazil. The table at the end shows the role and the blocks owned by Petrobras either alone or in a consortium for these four international bid rounds.

Midstream and Downstream

The new regulatory framework also brought significant changes to the ownership and use of hydrocarbon processing, transportation, and storage facilities in Brazil. Under the new law, the ANP will now be in charge of issuing special authorizations to any company or consortium established under Brazilian laws that wishes to build and operate refineries, gas plants, terminals, or pipelines.

Any interested party may now share common access to existing and future pipelines and marine terminals, by paying adequate remuneration to the owner of these facilities. The ANP will regulate priority rights and will establish tariffs in case the parties fail to reach an agreement. Imports and exports of oil, natural gas, and petroleum products will need an authorization issued by the ANP on a case-by-case basis. Finally, current regulations allow

E&P investors to sell their production in Brazil and receive payment based on international market prices.

Since 1953, Petrobras had been responsible for supplying the domestic market with petroleum products, fuel alcohol, and natural gas and, until recently, had a monopoly on imports and exports of crude oil and petroleum products. However, it did not have complete control of the country's refining capacity. The private companies Ipiranga and Manguinhos own two small refineries that were built prior to the founding of Petrobras. However, a de facto monopoly still prevails in the country because Petrobras has the remaining ten refineries, plus an asphalt plant, and accounts for 98.5% of Brazil's total capacity and daily output.

While representing a key element in the state company's activities, refining operations also constitute one of its biggest challenges as it enters a new era of competition and world market prices. Today's installed refining capacity is able to supply an estimated 80% of the domestic market's petroleum product needs. In terms of crude supply, about 70% already comes from Brazilian fields.

Petrobras still owns most of the storage tanks, marine terminals, crude and product pipelines, and ships and barges utilized to move oil, gas, and petroleum products throughout Brazil's onshore and offshore territory. This collection of assets consists of 64 owned ships and 50 leased vessels, with an overall capacity of 7 million dwt; a system of oil, gas, and product pipelines spanning 15,330 km; and 53 crude or products storage terminals with 66.723 million barrels of total capacity. Only 22% of all petroleum products are transported by pipeline, while 18% is moved by train and 15% by truck. The balance is shipped along the coast, either on coastal freighters or barges. Today, more than half of Brazils' petroleum products consumption is situated in other regions, with increases in the Northeast, North, and West-Central regions. Current interregional flows normally are directed to the supply of these newly growing regions by national or foreign products.

On May 1, 2000, Petrobras's newly formed subsidiary, Transpetro, took over all transportation of crude oil, natural gas, and derivatives – including pipelines and storage terminals. Transpetro was created as a result of a provision of the new Petroleum Law and is intended to be Petrobras's logistics arm. It will also be subject to the open-access rules and thus will have to allow shared use by third parties under nondiscriminatory tariffs.

Natural gas

In the Brazilian energy mix for 1998, natural gas accounted for only 3% of the total. However, government projections estimate that its share will increase to 10% by 2005. This increase is projected as a result of the federal government's Electric Generation Priority Program that has targeted the construction of 49 thermoelectric power plants spread throughout the country. Forty-three projects out of the total have natural gas as their fuel source. Ten percent of the energy mix is not a significant participation compared with other countries, even in South America. For instance, natural gas accounts for more than 60% of Argentine energy consumption.

However, when looking at a large market such as Brazil, one must consider the absolute values any of these percentages may refer to. Brazil's natural gas consumption in 2000 was 34 bcf and is expected to reach 700 bcf in 2005. Although the government justifies the increase in natural gas consumption as a direct result of the increased use of gas to generate electricity, according to the projections made by Petrobras for gas demand up to 2008, generation of electricity will only account for half of the national demand projected. The industrial sector will be responsible for most of the rest.

Petrobras historically has been responsible for carrying out natural gas exploration and production. Distribution, however, has been handled at the state level. Plans are underway to privatize parts of the country's natural gas sector in accordance with the national privatization agenda. Because Brazil maintains a highly federalized government system, many state governments are now shouldering heavy fiscal responsibilities. In an effort to raise necessary working capital, state governments have begun to sell their state natural gas distribution companies.

Fuels Market

In terms of volumes traded and market growth projections, the Brazilian distribution market for fuels is the largest in Latin America, moving no less than 75 million cubic meters (MMcm) in 1999, and growing at a consistent rate of 5% to 7% a year. Brazil's service station network is by far the largest in South America. According to the ANP, in June 2000, there were 28,929 retail outlets registered and operating in Brazil. Density per square kilometer is low due to the size of the country, but these outlets are relatively well distributed throughout the country, with higher concentration in Brazil’s most populated states.

The two main concerns regarding the Brazilian fuels market are pricing policy and the enforcement of quality controls. Prices have been used as a tool for implementing a number of macroeconomic and political measures. Recent concerns regarding the return of higher inflation rates forced the government to take a step back in the process of gradually allowing market forces to determine prices at the pump. The process of eliminating cross-subsidies, allowing the import of fuels, and leaving the distribution companies and retailers free to set their own profit margins was interrupted by the government's recent decision to re-establish strict profit margin controls. These new measures will have a great impact in the market because more than 300 new fuel distributors have appeared since industry restructuring began.

However, retail profit margins are not the only factor influencing prices at the pump. Prices are distorted by a complicated tax structure that was inherited from monopoly times. This structure includes special compensation collected by Petrobras at the refinery gate to make up for differences between the cost of crude produced in Brazil and the international prices applied to the imported crude. Basically, this old system has not been adapted to the new realities for two reasons: 1) this requires a federal law to be voted on by Congress; and 2) the government generates extra revenue from this “tax”, which it has included as a target account item for the International Monetary Fund.

Despite the fact that price liberalization is the keystone for the effective implementation of the new Petroleum Law, it seems that the Ministry of Mines and Energy and the Ministry of Finance will still be in charge of controlling internal prices until the drafting of fiscal and regulatory directives. In January 2002, there were some decreases in pump prices, as pointed out by the ANP, due to the availability of more detailed information to consumers.

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Petrobras Block Ownership (through consortia or alone)

Round	Block	Consortia		Signature Bonus
		Operator	Others	
1	BM-C-3	Petrobras 40%	Agip 40% YPF 20%	$2,592,296
1	BM-S-3	Amerada Hess 45%	Kerr McGee 30% Petrobras 25%	$7,693,032
1	BM-C-6	Petrobras 100%		$2,131,237
1	BM-CAL-1	Petrobras 50%	YPF 50%	$349,102
1	BM-FZA-1	BP 30%	Esso 25% Petrobras 25% Shell 12.5% British Borneo 12.5 %	$5,531,118
2	BM-S-7	Chevron 65%	Petrobras 35%	$28,643,436
2	BM-S-8	Petrobras 50%	Shell 40% Petrogal 10%	$21,789,098
2	BM-S-9	Petrobras 45%	BG 30% YPF 25%	$47,973,247
2	BM-S-10	Petrobras 50%	Chevron 25% BG 25%	$43,194,896
2	BM-S-11	Petrobras 65%	BG 25% Petrogal 10%	$6,422,052
2	BT-POT-4	Petrobras 100%		$278,997
2	BT-SEAL-2	Petrobras 100%		$183,052
2	BM-SEAL-4	Petrobras 60%	Amerada Hess 40 %	$1,001,168
3	BM-BAR-1	Petrobras 100%		$20,472,513
3	BM-C-14	TotalFinaElf 30 %	Petrobras 25% Enterprise 22.5% Shell 22.5%	$2,435,275
3	BM-C-16	Petrobras 100%		$181,407
3	BM-CAL-5	Petrobras 45%	Queiroz Galvâo 18.3% Petroserv 18.3% El Paso 18.3%	$2,646,888
3	BM-CAL-6	Petrobras 45%	Queiroz Galvâo 18.3% Petroserv 18.3% El Paso 18.3%	$97,928
3	BM-CE-1	Petrobras 100%		$127,573
3	BM-CE-2	Petrobras 100%		$146,395
3	BM-ES-5	Petrobras 65%	El Paso 35%	$5,400,148
3	BM-ES-9	Esso 40%	Petrobras 30% Kerr McGee 30%	$4,597,572
3	BM-J-1	Petrobras 100%		$356,733
3	BM-S-12	Petrobras 70%	Queiroz Galvâo 30%	$2,253,543
3	BM-S-17	Petrobras 50%	Enterprise 25% Statoil 25%	$8,767,257
3	BM-S-21	Petrobras 80%	Petrogal 20%	$543,649
3	BM-S-24	Petrobras 100%		$137,364
3	BT-ES-12	Petrobras 100%		$264,330
4	BM-C-25	Petrobras 40%	Shell 60%	$2,565,210
4	BM-J-3	Petrobras 60%	Statoil 40%	$3,545,825
4	BM-POT-11	Petrobras 60%	El Paso 40%	$85,128
4	BM-POT-13	Petrobras 40%	El Paso 30% Unocal 30%	$271,138
4	BM-SEAL-9	Petrobras 85%	Partex Oil and Gas Corporation 15%	$1,696,438
4	BT-ES-15	Petrobras 100%		$175,549
4	BT-POT-8	Petrobras 100%		$766,530
4	BT-SOL-1	Petrobras 100%		$86,893

Source: ANP

<u>Sources:</u>

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