The Structure of Natural Gas Markets in Argentina and Antitrust Issues in Regional Energy Integration

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Foreword

During the last two decades, Latin American countries have brought about important reforms in infrastructure services, encompassing changes both in ownership patterns and in operating terms. Regulatory frameworks have also evolved from monopoly and public ownership settings lacking specific regulations, towards scenarios where private participation prevails, with competition and regulation playing complementary roles. However, even though competition is a pivotal feature to all public services reform processes, a high degree of vertical and horizontal concentration pervades within the industrial structure of many of the countries in Latin American and the Caribbean. Furthermore, mergers and acquisitions taking place in the context of an increasingly global economy, without the appropriate legislation and accounting rules geared at promoting competition and restraining market control, have often led to reduced levels of competition for the market or in the market.

The Inter-American Development Bank has actively promoted infrastructure reform development in Latin America and the Caribbean. The Bank has also financed private projects aimed at fostering the implementation of reforms particularly those in the power, gas, water, and transport sectors. The reforms have succeeded in fostering private participation. Because of the reforms, Latin-American countries were able to attract private participation to the various infrastructure sectors like transport energy, potable water as well as sewerage and telecommunications. Private participation in infrastructure has produced several benefits: reduction of public deficits, introduction of new technologies, improvement of efficiency, expansion of consumers'coverage.

These reforms seem less successful in promoting effective competition in infrastructure sectors, which is the other building block of the reforms. In most countries, indicators show weak competition in the region's infrastructure sectors.

In this context, the Infrastructure and Financial Market Division of the Inter-American Development Bank is developing a Program, *Competition Policy in Infrastructure Sectors*, consisting in identifying competition problems in infrastructure sectors and the legal and structural reasons that may provoke them. This program also includes the analysis and discussion of competition regulations appropriate to promote competition in infrastructure services in emerging countries and particularly in the Latin American and Caribbean region.

This article, *Natural Gas Market Structure in Argentina and Regional Energy Integration Antitrust Issues b*y Diego Bondorevsky and Diego Petrecolla, discusses to what extend the gas industry structures of Brazil and Argentina, controlled by a state-owned company and a private company, prevent an effective regional integration of gas markets. In order to move forward in developing these markets and speeding up investment in new transportation networks, the authors recommend three short-term measures. The first measure is to ensure that the divestment of assets that YPF pledged to carry out is indeed completed. The second measure is to guarantee that the natural gas production from Bolivia and Peru is not cornered or monopolized by large incumbent actors. The third step is for national and regional antitrust agencies to closely examine the impact of alliances between the dominant actors. Traditional competition tools, as those prohibiting anti-competitive agreements, or abusive exploitation of market power are required. However, appropriate regulations are crucial for ensuring that prices and access to essential facilities are nondiscriminatory and fair. The article is part of the set of publications included in the Competition Program

Pietro Masci
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Introduction

Natural gas basins in Argentina and the Southern Cone of South America are located far away from the areas of consumption and, in most instances, the centers of production and consumption are connected by point-to-point networks with no grid interconnecting the different hubs. This network configuration has led to a high degree of market segmentation, where each individual market has a different output and transportation capacity and very few exchange nodes are available. As a result of this disconnected market, gas prices are set in each local market independently of one another and are not based on any international benchmark price, as is the case with other commodities. Novara (1997) remarks that even in trade between the United States and Canada, no evidence points to there being any type of representative or marker price, either for natural gas production areas or entry points into large urban population centers in those countries.[1]

Notwithstanding, integration of natural gas markets is spreading throughout the world.[2] The European market, for example, is highly integrated. The main exporting countries of Europe include Norway, Holland and Russia, with the latter country possessing the most extensive natural gas reserves in the world. The main importing nations are Germany, Italy, and Spain. Osmundsen (2000) points to one important factor that has contributed to integration of natural gas markets: the motivation behind gas importing countries is to diversify supply, i.e., promoting competition in gas supply in order to ensure provision of energy in flexible amounts, rather than seeking out the lowest possible energy prices. Moreover, the number of natural gas pipelines between natural gas producing and importing countries in Asia is growing at a steady pace. China is a good example of this growing phenomenon, where a great deal of transportation projects are underway in order to meet the demands of its growing energy markets by importing gas from the basins of Russia and Indonesia.

The integration of Argentinean gas in the region began in the 1970's with the signing of an agreement for the construction of the gas pipeline between Bolivia and Argentina. The agreement involved the Argentinean state-owned gas transportation and distribution company Gas del Estado's purchase of natural gas produced by Yacimientos Petrolíferos Fiscales Bolivianos, the Bolivian state-owned oil company widely known by its Spanish initials YPFB. Under this agreement, Bolivia was assured of a certain volume of gas exports to Argentina, which represents 5 percent of Bolivia's yearly GNP, and Argentina secured a steady flow of nonrenewable fuel at a low price making it possible to supply enough gas to satisfy its fast growing domestic consumption while maintaining reserves. The integration process between Bolivia and Argentina has undergone substantial changes over the past few years as a result of privatization of Gas del Estado and YPF and construction of a gas pipeline between Brazil and Bolivia. This pipeline has led Bolivia to redirect its gas output to the Brazilian market.

Between 1995 and 2000, significant progress was made toward energy integration between

[1] This author further states that prices in different spot markets are not co-integrated and are not merged into a single net price of transportation cost differentials as one would expect they would be.

[2] Compared to other fuels, natural gas is relatively inefficient with regard to transportation, because one of its characteristics is that it is very high volume on a caloric potential per-unit basis. For example, one million BTUs of natural gas occupies approximately one square meter under normal conditions of atmosphere and temperature, whereas only 7.5 gallons of gasoline contain that same amount of energy.

Argentina and neighboring countries. However, in a one hundred and eighty-degree turnabout from its original integration experience with Bolivia, Argentina has become a net exporter of energy products. Furthermore, state-owned enterprises are no longer the force behind integration, but rather the private sector has taken the lead in this effort. In fact, private companies began to lay the first gas and oil pipelines and set up the first electrical transmission networks in 1995 between Argentina and Chile. Jadresic (1999) states that several factors contributed to the development of networks: 1) deregulation of the energy sector in both countries, which made it possible for the private sector to invest in markets that were traditionally in the hands of the public sector; 2) attainment of political integration between both nations over the course of the past decade, as longstanding border disputes were finally settled; and 3) adoption of new technologies in electrical power generation, such as the combined cycle generator, which provided critical mass for construction of infrastructure works. Additionally, private companies, such as Enersis or Transcanada, have played a major role in the development of electricity and gas transportation networks between Argentina and Chile.

Examination of natural gas market integration is worthwhile for two reasons. Firstly, consumption of this type of fuel is on the rise throughout the region as a result of the development of combined cycle electric power plants. Secondly, by delving into this topic, we can shed light on how the particular structure of this sector in Argentina has acted as a barrier to competition from Bolivian natural gas and has caused prices to be higher in Argentina than in other countries of the region, even though this country has significant natural gas reserves and is the main producer of this product in the Southern Cone. In fact, by YPF's controlling the gas pipeline between Bolivia and Argentina and most of the Argentina's gas reserves, it is virtually impossible for the sources of supply to become diverse; in other words, for there to be competition in the upstream sector. Diversification of natural gas supply would make it possible to spread out market supply in Argentina and thus make it easier for distributors and major users to find alternative prices to those offered by YPF.

The purpose of this paper is to take a closer look at the process of natural gas market integration in the Southern Cone of South America. More specifically, the paper examines infrastructure and performance of the sector in Argentina, the effects that this sector has had on overall regional energy integration, and what regulatory and antitrust issues have arisen throughout the region as a consequence.

Restructuring and Privatization of the Industry: Transmission and Distribution

Until 1992, Gas del Estado handled all purchase, transportation, distribution and trading (of mainly YPF-produced gas) in the Argentinean gas basins: Neuquina, Noroeste, San Jorge, and Austral. Law 24076, which was enacted in 1992, ordered the unbundling of these activities which were horizontally divided by geographic zones. In turn, this law established a new regulatory framework for the segments of transportation and distribution. This process gave rise to concessionaires who were awarded a contract through a process of international tender in December of 1992.[3] Thus, the structure of the industry belonging to Gas del Estado was broken down into two transportation companies, to which existing gas pipelines were assigned, and nine low pressure distributors that serve the retail market.[4] Transportation network capacity rose between December of 1992 and the same month of 1999 by 50 percent, from 74.7 cubic meters per day to 149.9 cubic meters per day (at a winter utilization rate of 95 percent). With regard to the distribution network, 66,765 Km of pipelines had been laid by December of 1992. Currently the total length of pipelines has reached 101,569 Km, which represents an increase of more than 52 percent.[5]

The increase in the system's transportation capacity made it possible to notably reduce gas consumption restrictions that had been placed on major users during times of peak demand. For example, in 1993, such constraints applied to more than 34 percent of all gas injected into the system, while in 1996, the percentage decreased to 12.6 percent, and in 1999 these restrictions only affected 1.2 percent of the total amount of gas.[6] Moreover, price controls on gas transportation and distribution increased between December of 1992 and May of 2000 by only 3 percent for residential users. Additionally, price controls on industrial rates fell by more than 13 percent between these same dates as a result of discounts granted by transportation companies on the maximum regulated rate.

Law 24076 established the regulatory framework for concessionaires of natural monopolies of gas transportation and distribution.[7] Next, a discussion of particular aspects of the regulatory framework is included.

UNBUNDLING

Article 33 of Law 24076, enacted in 1992, establishes a separation between gas transportation and sales in order to prevent carriers from distorting competition in the trading segment. This unbundling helps to eliminate the incentive to discriminate in providing transportation services between producers and users as a function of or

[3] A total of US$2.077 billion was collected in revenue from the privatization of Gas del Estado and of this amount, US$680 million was paid in cash with the rest being funded with internal and external debt instruments.

[4] Originally, there were eight. In July, 1998, Gasnea was added to the mix. Furthermore, it should be clarified that, in some instances, the distributors also deal in medium and high pressure service.

[5] ENARGAS' Annual Reports.

[6] ENARGAS' Annual Reports

[7] A natural monopoly occurs when a single firm is able to offer a good at a lower total cost than two or more firms.

in conjunction with trading activities. The Law specifically states that *carriers may not purchase nor sell gas, except for acquisitions that may be carried out for their own consumption and for the natural gas required to maintain operability of the transmission system, the volume of which shall be determined by the [regulatory] entity on a case by case basis.*

The category of *comercializador* or trader is defined in Article 14 of Law 24076 as follows: "A trader is considered someone who purchases and sells natural gas on account of third parties." These traders, who bring major consumers together with producers, play a key role in stimulating competition in order to bring about better downstream prices. In order to be able to broker such transactions, the right of open access to the networks and physical by pass must be guaranteed.

OPEN ACCESS OF THIRD PARTIES TO THE NETWORK AND CONSUMER CHOICE

Article 26 of Law 24076 provides that "*carriers and distributors are obligated to permit indiscriminate access of third parties to any transportation and distribution capacity of their respective systems that may not be under a commitment to the supply of contracted demand*."

The law establishes the freedom of consumers to choose a trader. Users that require more than 5,000 cubic meters/day[8] may refrain from using the distributor's services and directly acquire energy from producers or traders.

In order for freedom of choice for consumers to be viable, regulations allow for construction of lines that physically by-pass existing networks. Thus, Article 49 of Law 24076 establishes that: *"… Consumers who contract directly with the producer may build, at their own cost, their own feeder branch lines to meet their own consumption needs.*" Article 13 of this law additionally provides for commercial by pass stipulating: "Notwithstanding the rights granted to distributors for their qualification [eligibility], any consumer may agree to the purchase of natural gas directly with producers or traders, by freely negotiating the terms and conditions of the transaction."

In 1993, four companies opted to use a supplier other than the local distributor in their geographic zone (who together represented just 3 percent of the total gas delivered). This number rose to 60 companies in 1996 (or 23 percent of total gas delivered), and to 149 companies in 1999 (33 percent of the gas delivered).

RATE REGULATION

Transportation and distribution rates or tariffs are determined by the regulatory agency of the sector, which sets maximum prices. During the international tender, tariff ceilings were written into the terms of bidding for gas transportation and distribution services and these prices are subject to periodic review every five years. Biannual rate adjustments are based on the formula RPI-X+K, where RPI is the retail price index in the United States, X is a factor designed to stimulate allocation efficiency, and K is factor aimed at promoting investment in the service

The rate charged to end-users consists of three components: the price of transportation, the price of distribution, and the price of gas at the point of entry into the transmission system.[9] This arrangement causes users who purchase through a distributor to absorb the price of gas negotiated by the distributor; whereas, users that directly negotiate with a trader or producer absorb the price agreed upon with the trader or producer.

PERFORMANCE-BASED REGULATION

Even though Law 24076 does not mention comparison of efficiency between companies as a regulatory mechanism, the horizontal break up of the segments of transportation and distribution makes it possible for regulators to compare

[8] Up until 2000, the requirements were 10,000 cubic meters.

[9] These prices are different from the wellhead price, since they are added to the costs of treatment, processing and transmission. Therefore, the process undergone by gas up until the time it reaches the transmission network is what determines gas quality and the appropriate price based on the caloric efficiency, degree of purity, and pollutant content as well as content of other harmful substances.

different companies' performance. Nevertheless, the regulatory agency, as yet, has not conducted such comparisons in determining rates, even though regulators could readily gain access to information and records on each individual company.

The Wholesale Market

MAJOR PLAYERS

The wholesale natural gas market at the wellhead or at the point of pipeline injection is made up gas producers and importers on the supply side. The demand side consists of distribution companies, traders and customers whose requirements exceed 5,000 cubic meters/day.

Distributors act as exclusive purchase agents for consumers whose requirements fall under the 5,000 cubic meters/day mark and whose demand is highly inflexible. Electricity, liquefied gas and other fuels mainly used for home heating are alternatives to natural gas.[10] Industrial consumers and electric power generators may carry out physical or commercial by pass and are characterized by having more flexible demand.

If the price that consumers are willing to pay for natural gas at the point of entry into the transportation system or the net back value (the price at the point of consumption minus the transportation cost up until that point) is greater than the cost of production at the gas field, agents will indeed be interested in gas extraction. Otherwise, natural gas will simply not be extracted. In Argentina, the wellhead price of natural gas is lower than the wellhead price in other countries, but transportation costs to the centers of consumption, particularly Buenos Aires, tend to drive the price up. Nevertheless, it is fitting to mention that the net back value in Argentina, as of 1998, was higher than the wellhead price. In Brazil, however, the situation is quite different and the net back value is lower than the wellhead cost of gas. This is because, while on the one hand, transportation costs and the caloric requirements are high and, on the other hand, the price of fuel oil is relatively low since it is subsidized, and fuel oil is the benchmark of *natural gas value* (Visintini, 1993).

REMOVAL OF PRICE CONTROLS

Gas extraction and production in Argentina is governed by the Law of Hydrocarbons (Law 17319), in addition to amendments thereto and the decrees or executive orders emanating therefrom. Nonetheless, all price controls on wellhead prices were totally removed as of the beginning of 1994 under decree 2731.

Balzarotti (1999) states that because of growing marginal costs of the fields and the fact that the minimum scale of gas extraction platforms (the point of production where economies of scale are exhausted) is not too large in relation to the size of the markets being supplied, opening up the gas market to more competition leads to higher efficiency in allocation of resources. In Argentina, however, removal of market restrictions and wellhead price controls took place in an environment that was not suitable for building a competitive market. That environment was characterized by several circumstances that stood in the way of promoting competition in gas supply.[11] First and foremost, a single company, YPF, controlled 60 percent of all sales. Secondly, heavy investment in exploration of reserves was required and this kept new suppliers from entering into the market, since exploration entails high sunk production costs. In other words, it can take a long time until a company is able to produce enough and recover the initial investment. And lastly, legal barriers to entry exist as a result of the way ownership rights are acquired in this industry. More specifically, companies are required to obtain permits for exploration and subsequently a concession for

[10] In any case, the technology for consumers to instantly change between gas or electricity is not widely used in Argentina.

[11] The characteristics which made it impossible for a competitive market to come about are listed in ENARGAS file 4943, dated August, 1999.

operation from the Secretariat of Energy. These circumstances, Novara states (1997), in which a high level of reserves is in the hands of one company or an associated group, act as a barrier to the entry of other competitors, or prevent attempts of existing competitors to increase their share of sales by lowering prices.

SUPPLY STRUCTURE

As of December of 1992, the month that Gas del Estado was privatized, 90 percent of the gas purchased by Gas del Estado was acquired mainly from YPF and the rest was imported from Bolivia (7 percent) or was purchased from other private domestic producers (3 percent). The following chart shows the evolution of YPF's shares in the natural gas market between 1994 (one year after its privatization) and 1999.[12] It is useful to highlight the following aspects of this evolution.

First, between 1994 and 1998, a decrease was posted for YPF's share of sales of the natural gas it produced itself and this was offset by an increase in sales of gas produced by third parties and controlled by YPF.[13] Secondly, in 1999 YPF's market share was significantly reduced mainly as a result of a drop in third party gas traded by YPF. In 1999, YPF implicitly recognized its own anti-competitive practices and pledged to gradually reduce trading in third party-produced gas.[14]

YPF: Sales of Natural Gas
(in % over the market total)

	1994	1995	1996	1997	1998	1999
Own gas	40	39	34	34	34	40
Own gas plus third party gas	63	58	60	62	59	51

Source: ENARGAS

MARKET POWER INDEXES

The Herfindahal-Hirschman index of market power which was conducted by ENARGAS for 1998 and 1999 also shows a decrease in market power for this period in all of the basins included in the study, especially in the *Noroeste* basin. These variations may be the result of YPF's policy of gradually abandoning the practice of trading third party-produced gas. Nevertheless, the following table shows that the indexes of the top four gas producing basins have not varied substantially.

Herfindhal-Hirschman Index				
	Neuquén	Austral	Noroeste	Country Total
1998	3703	3271	5772	3725
1999	3493	2587	2978	2841
Indexes of the top four producers				
	Neuquén	Austral	Noroeste	Country Total
1998	84.7%	89.5%	96.9%	80.2%
1999	86.7%	91.9%	92.2%	74.9%

Source: ENARGAS

[12] The figures for 1993 are not included since the privatization took place in the middle of 1993.

[13] It must be clarified that beginning in September of 1999, REPSOL took control of YPF, and the company resulting from the merger came to be called Repsol-YPF. For the purposes of this paper, it shall continue to be referred to as YPF for periods following September 1999.

[14] ENARGAS File #4943, pages 467, 468, 469.

Signs of Anti-competitive Behavior

POTENTIAL FOR DISTRIBUTORS TO ENGAGE IN ANTI-COMPETITIVE BEHAVIOR

It is helpful to divide gas distribution companies' clientele into two basic types for purposes of examining anti-competitive behavior. One type of customer has the freedom to choose a supplier, while the other type does not have this option and is served by the distributor. The latter type can be called 'captive customers.' Distribution companies that serve the two different types of consumers usually subsidize freedom-of-choice customers at the expense of captive consumers in order to avoid defection of noncaptive customers to other suppliers. There are few incentives for distributors to reduce the acquisition costs of gas for captive customers, when the distributor has the ability to pass these costs on to the end-consumer. Distributors may even have incentive to acquire gas at high prices for these customers, if the trading margin is a percentage of the acquisition costs. This type of behavior has been considered anti-competitive by some courts in the United States, such as in the cases of *Illinois Brick* and *Illinois v. Panhandle Eastern PipeLine Company*.

In the Illinois Brick case, the New Mexico Court authorized consumers to file suit based on a claim that the wholesale gas price which is passed on to the end-consumer by the distributor is the result of an agreement between producers and distributors that is entered into outside of the market.[15] In the case of Illinois v. Panhandle Eastern Pipeline Company, the court only ruled in favor of a complaint filed by residential but not industrial consumers of natural gas. In this ruling, the judge distinguished between two different types of transaction for the purposes of examining agreements between distributors and producers. One type of transaction consisted of gas sales to the distributor for subsequent sale to residential customers who do not have any other option than purchasing through the distributor. In these instances, the surcharge stemming from an agreement between producers and distributors is passed on entirely to the consumer. The other type of transaction was sales to distributors for subsequent resale to industrial consumers that have the option of switching suppliers. In this last example, the surcharge is not passed on to the customer because of the option to switch suppliers is available. When the second type of transaction occurs, the distributor loses in the end as a result of the anti-competitive behavior taking place between the distributor and the producer. In other words, a distributor would have great incentive to report anti-competitive behavior in the wholesale market, if such behavior would result in a loss of industrial customer sales. Nevertheless, the distributor will have less incentive to file a complaint if most of its customers are residential or other consumers with inflexible demand, who will absorb all or most of the costs.

EFFECTS OF THE WHOLESALE MARKET ON THE BEHAVIOR OF DISTRIBUTORS

In ENARGAS File #4943, which was prepared as part of an examination of a price increase in the nonregulated component for residential and industrial customers, it is stated that distributors in Argentina do engage in discriminatory practices in the treatment of industrial vis-à-vis residential customers. This behavior was caused by the need to make heavily discounted rates available to freedom-of-choice customers as a result of the practices of suppliers.[16]

[15] These cases are cited in Stewart (1990).

[16] According to data from ENARGAS, between December, 1992 and May, 1999, residential and indus-

The evidence cited in ENARGAS File #4943 shows that distributors, facing the likelihood of losing customers who were free to chose a supplier, namely thermal powered electric generator plants and large industry, were forced to further discount prices and cut into their distribution margin.

THIRD PARTY GAS TRADING

In this section we shall examine how YPF was able to trade gas produced by third parties and stifle competition in the natural gas supply in Argentina even though several distributors sought to open up the market to a diversity of suppliers.[17]

When the industry was privatized in 1993, gas purchase contracts from other producers were transferred to YPF. In addition to receiving contracts as a result of such transfers, YPF continued to sign new contracts with other domestic and foreign producers. A contract entered into between Petrobas Internacional S.A., Braspetro, and YPF, S.A. in 1994 is particularly noteworthy because it represents failed attempts at opening the natural gas supply to a diversity of players in the Noreste basin for the distributors Litoral Gas and Gas del Centro. YPF had pledged to pay the price that it stipulated in its contracts with distributors or major customers for natural gas it acquired from Petrobras, and in so doing, inexorably restricted competition in this basin. Additionally, the time limit on YPF's right to trade up to 15 percent of Bridas', Pluspetrol's and Tecpetrol's production in the Ramos field was extended. In fact, 15 percent of the total volume produced by these companies was transferred to YPF for trading at the time of privatization. Subsequent to the date of the original transfer, YPF filed a request for the National Government to extend its concession for 10 more years and maintain YPF's option to trade up to 15 percent of gas production from those companies. The government granted the request and issued Administrative Decision 92/96 which provided for these terms.

As a result of a public hearing,[18] YPF signed a letter of commitment on October 7, 1999 pledging to gradually phase out trading in natural gas produced by third parties.

BENCHMARK PRICES: A MEANS OF PROVIDING INCENTIVE FOR THE REDUCTION OF WHOLESALE PRICES

Year	**Trading of Third Party-Produced Natural Gas** (in million meters^3/day)
1998	14
1999	14
2000	10
2001	9 to 8
2002	8 to 7
2003 (up until April)	6 to 5
2003 (beginning May)	0

Source: ENARGAS File #4943.

In July of 1995, Administrative Decree 1020 introduced an optional system to provide incentive for natural gas distributors to minimize the high cost of gas acquisition for captive users resulting from passthrough. This measure was intended to provide incentive for the purchase of inexpensive gas on the spot market by introducing a benchmark price that acted as the minimum price and an average basin price that acted as the maximum price.

The way this arrangement worked is that in the event a distributor acquires natural gas at a lower price than the reference price, it is rewarded by being allowed to pass on 50 percent of the difference between the purchase and reference prices. However, should the purchase price have come in higher than the average basin price, then the distributor is punished by only being allowed to pass on to the customer 50 per-

trial rates increased respectively by 7.67 percent (74 percent of this increase was due to a rise in gas prices on the wholesale market) and 11.53 percent (82 percent, due to the same rise). The increase stemming from the regulated component, predictably, was less significant for industrial customers as it was for residential ones.

[17] Evidence of these attempts can be found in ENARGAS File #4943.

[18] ENARGAS File #4943, pages 467, 468, and 469.

cent of the difference between the purchase and average basin price. When prices fall between the ceiling and the floor, a distributor is neither rewarded nor punished, but rather is permitted to pass on the purchase price to customers (a classic passthrough).

As a result of poor development of the natural gas spot market in Argentina compared to the contract market, the average number of distributors that used the benchmark price system between October of 1995 and April of 2001 was only four companies for each six-month period.

YPF'S EFFORT TO LEAD THE WAY TOWARD STABLE PRICES

The trading market is controlled by YPF, which single-handedly brokers more than 50 percent of natural gas sales. The remaining suppliers are smaller companies which individually represent a nonsignificant percentage of the market share. Consequently, the dominant company pays little or no attention to the smaller companies in designing pricing and volume strategies because these other companies are not in a position to increase sales by lowering prices. These companies follow the lead of YPF in setting prices since, in the end, a policy of price decreases would be ineffective to boost sales because of the most-favored-customer policy followed by YPF (detailed explanation of this policy provided below). ENARGAS File # 4943 highlights the close correlation between YPF price performance for 1994 to 1998 and prices of Pluspetrol, Petololera San Jorge and Perez Companc in the austral basin, which 97 percent of the time matched YPF's prices.

YPF wrote into its business contracts with distributors and other consumers a most-favored-customer clause. This provision ensures for YPF customers a price as low as the lowest price offered by its competitors. In implementing such a practice, YPF made it virtually impossible for the competition to increase market share by lowering prices, since YPF's most-favored-customers were in a contractual position to demand the same price from their supplier. The most-favored-customer clause, thus, serves to bring about tacit collusion between the dominant company and its allies and acts as a barrier to the entry of new competitors. YPF acknowledged that use of such a clause is an unfair practice and, in the above-cited 1999 commitment, pledged to discontinue inserting such a provision in new contracts.

Regional Integration

IMPORTERS' VERSUS EXPORTERS' REQUIREMENTS

Osmusden et al. (2000) takes a close look at supply and demand of natural gas importers. Importers require volume and price flexibility in order to adapt to changes in end-users' needs. On the other hand, exporters, who many times face heavy sunk costs for exploration and even gas pipeline construction in some instances, require long term contracts with little or no price or volume variation.

The most common type of contract used in natural gas trading is a fixed-amount agreement known as a 'take or pay' contract and a pricing structure with both fixed and variable components. The variable part of this scheme is a function of the price of substitute fuels, whereas the fixed-amount provision is designed to cover gas producers' fixed costs. Under such contracts the seller runs the partial risk of price fluctuations, while the purchaser runs the risk that the prices of alternative fuels may be lower than the fixed price component.

DIFFERENCES BETWEEN DOMESTIC AND EXPORT PRICES

Mounting evidence over the past years seems to show that producers are selling natural gas on foreign markets, particularly in Chile, at lower prices than on the domestic market.[19] The price differential is the result of the sellers' behavior and the demand requirements in the purchasing country, even though the price is set by the selling company. So, the peculiarities of domestic demand in a given market for natural gas account for price differences.

In the energy mix of Argentina, natural gas represents one of the highest percentages in the world at 47 percent of total output. In Chile, natural gas accounted for only 7 percent of the total energy mix in 1994 and, in Brazil, the figure is currently estimated to be around 3 percent. The biggest difference, however, lies in the requirements of natural gas consumers in each country. In Argentina, natural gas is mainly consumed by residential users who are relatively inflexible with regard to demand and are supplied by distribution companies. These distributors are able to pass on the cost of acquiring gas to the end-users and, therefore, lack incentives to minimize these costs. On the other hand, in Chile, natural gas is mainly used for electric power generation by companies, which possess a diversified mix of power generation means. These companies have the ability to substitute natural gas for other alternative fuels (or sources such as hydroelectric power) in the process of electric power production. Consequently, there tends to be greater flexibility in gas pricing in Chile than in Argentina.

We can point to two additional reasons why domestic and foreign market sales prices vary so widely in this region. The first of these reasons is the policy followed by Chile for purchases of natural gas. On this subject Novara (1998) states that when the process of international tender was held for construction of gas pipelines and gas supply from Argentina to Chile, the criteria used for selecting the winning bid was the price of natural gas as well as the cost of transportation. Therefore, in order for a construction company to be awarded the contract, it was essential to minimize both the cost of transportation as well as the wellhead price of gas acquisition. This competition helped to spur on negotiations between gas pipeline building consortiums and Argentinean natural gas producers, thus making it possible to obtain better prices than those offered to domestic distributors. The other reason

[19] See Novara, 1997. References to this issue can also be found in ENARGAS File #4943, page 422, quote from the Ministry of Economy File #750.681.

for price differences between the foreign and domestic markets is a clause in export contracts that prohibits resale of gas on the domestic market. These provisions, for the most part, make it impossible for traders to engage in arbitrage. YPF recognized the use of these clauses in the above-mentioned commitment of October 1999, in which it states: *We would propose to our customers the elimination of the clauses that prevent unconditional resale and/or re-importation of gas, but with the proper safeguard over fiscal responsibility in export operations.*[20]

BUSINESS STRATEGIES AND THE OBSTACLES TO OPEN ACCESS

The regional energy market shapes the strategies followed by distributors, carriers and producers. Nevertheless, these strategies are developed on the basis of the different regulations in effect in different countries which, sometimes, end up hampering development of a competitive market and, other times, serve to promote competition.

In the next section, the process of integration with Argentina's neighbors will be used to illustrate the role that business strategies and regulations play in shaping regional markets. This integration would make it possible to open up supply to a diversity of players and thus increase competition in the Argentinean market by importing gas from Bolivia. Moreover, as a logical corollary to integration, the size of the market would increase and, consequently, exports to Chile and Brazil would obviously rise, thus making it possible for the sunk costs of raising the level of proven reserves to be absorbed. Nevertheless, increased natural gas exports from Argentina to Brazil via Bolivia would require a higher capacity connection with the neighboring country. This expansion is also the key to hemispheric integration of the market, since it would make it possible for potential gas exporting nations such as Peru, Ecuador, and Venezuela to trade gas through Bolivia. In the following sections the key points of development between Argentina and Bolivia, Bolivia and Brazil, Mercosur countries, Argentina and Chile, and lastly, between Bolivia and Peru, are outlined.

Argentina-Bolivia

The ability to import gas from Bolivia into Argentina is predicated upon the gas pipeline connecting Northern Argentina to Bolivia. Over the past few years, the capacity of this pipeline has been 6,000 cubic meters/day, which accounts for only 7 percent of Argentine domestic consumption.

Even with this limited capacity, the pipeline has not been used to import gas from Bolivia into Argentina since 1998. This has been because of a strategy devised by the producing companies, following YPF's leadership, which consists of using the capacity of the pipeline to export Argentina's natural gas output into Brazil via this pipeline and another pipeline that connects Bolivia and Brazil. When YPF was privatized, two things occurred in the bidding process which placed YPF in a privileged position in the northwest natural gas basin, enabling the newly privatized company to effectively control the market. The first advantage YPF was given was an option to sell Bolivian gas under a purchase contract to Gas del Estado of Argentina. The advantage was that YPF was given majority ownership in Refinor, the refinery where Bolivian gas undergoes the process of separation of gasoline and rich gases before being injected into Transportadora de Gas del Norte's gas pipeline. Refinor is also the owner of the gas pipeline that connects the Bolivian line with the refinery.[21]

As an example of business strategies aimed at holding up imports, it is fitting to mention that in

[20] Bogo (2000) states that these types of clauses are prohibited in Japan, the United States and the European Community. This author maintains that the ability to engage in arbitration has been considered a basic tool for building and sustaining a common European market.

[21] The collection and transmission lines in the upstream segment remained in the hands of the producers with any restrictions. Stock share ownership was broken down as follows: YPF (30 percent), Perez Companc (28 percent), Pluspetrol (21 percent), Astra (10.5 percent) and Isaura (10.5 percent). Furthermore, the conditions for open access to the gas pipeline between Bolivia and Argentina are stipulated in law 17319.

1993 a group of distributors[22] sought an alternative supplier to YPF in Bolivia. However, the offer that these distributors received from Refinor for gas imported from Bolivia was extremely high.[23]

Change seems to be looming on the horizon with regard to this situation, as an Argentinean company, Pluspetrol, announced in April of 2001 that it will construct another gas pipeline between the two countries and that importation of natural gas from Bolivia for electric power generation in its combined cycle plant in northwest Argentina shall commence thereafter. Furthermore, British Gas plans to lay a new pipeline between Tarija (Bolivia) and the city of Uruguayana (Brazil), which shall stretch through northeastern Argentina supplementing the installed capacity of TGN.

Bolivia-Brazil

The length of the gas pipeline that runs from Santa Cruz de las Sierras to San Pablo and Porto Alegre surpasses 3,000 kilometers and ranks as one of the greatest energy infrastructure feats of South America. *Petrobras* was the main force behind this project, despite the fact that proven gas reserves in Bolivia were far below the level of transportation capacity that would be required to make the project viable and, furthermore, demand for natural gas in Brazil was quite low. The investment of around US$2 billion was partially financed with a loan from the Inter-American Development Bank (US$240 million) and the World Bank (US$310 million).

Two companies were created for construction and operation of the gas pipeline. On the Bolivian side, the company was chartered as GTB (Gas Transboliviano S.A.) and was made up of the subsidiary of Petrobras, Gaspetro (with 9 percent of the shares), together with Enron (30 percent), Shell (30 percent), Bolivian pension funds (25 percent) and BBPP (6 percent) (a holding company headed by El Paso Energy, British Gas and the Australian company BHP). On the Brazilian side, TBG was created (Transportadora Brasileira Gasoduto Bolivia-Brasil) which consisted of Gaspetro (51 percent), Enron (7 percent), Shell (7 percent) and Bolivian pension funds (6 percent).

Law and Franco (1998) state that during development of the project, in its capacity as a financier, the World Bank had negotiated with the Brazilian government and the controlling company of the Brazilian side of the gas pipeline, TBG, in which Petrobras is majority shareholder, certain policies that were to be followed once the project went into operation. The policies involved nondiscriminatory access of third parties to the network; the unbundling of functions; adoption of transportation rates for uncommitted capacity on the basis of length of pipeline to be used; and the requirement that TBG only act as a carrier or transportation company and not as a trader of its own upstream reserves.

Nevertheless, negotiations between the national oil companies of Bolivia and Brazil were actually predicated upon the Brazilian government's good intentions because the true basis for the project was a contract signed in 1993 between Petrobras and YPFB for purchase of natural gas by the Brazilian company from the Bolivian oil company over a period of 20 years. The contract also included a provision stipulating a maximum volume of 8 million cubic meters/day, which would subsequently be increased to 16 million cubic meters/day. Moreover, the contract contained an option for purchase of additional amounts of gas not to exceed 30 million cubic meters/day, provided that these amounts were available and were not required to supply the Bolivian market.

A transmission capacity option was created as part of the funding structure of the project (TCO)[24] whereby the purchaser could transport up to 6 million cubic meters/day over and above

[22] Litoral Gas, a group which included Gasnor S.A., Distriubidora de Gas del Centro S.A. and Gas Natural Ban S.A.

[23] These attempts culminated with a note from the distributor Litoral Gas to the Argentinean regulatory body ENARGAS stating that it had no other choice than to accept YPF's price for domestically produced or traded gas. (ENARGAS File #4943).

[24] Any additional transmission capacity above the volumes handled by TCO until maximum pipeline capacity was reached, in the parlance of the project, was known as extra transmission capacity or TCX.

the amount stipulated to in the contract by paying for operational costs of transmission in advance. This option was available to all participants up until construction of the gas pipeline commenced at which time Petrobras took advantage of this option to the exclusion of others.

In September of 2000, following intense negotiations with Agencia Nacional de Petróleo de Brasil (ANP), Enron signed a contract with Petrobras whereby Enron was granted the right to transport natural gas (1 million cubic meters/day) from Bolivia to Brazil via the gas pipeline connecting the two countries. Thus, eight years after commencement of the project, the principle of open access to independent traders not associated with Petrobras is implemented for the first time.

During that same year, Enron was eventually authorized by the regulatory agency of the Brazilian electricity sector to import 150 MW of electricity from Bolivia. Consequently, Enron is planing to construct a thermal electric generation plant in Porto Suarez, a town located on the Bolivian/Brazilian border. Since the price of natural gas in Bolivia is US 0.90¢ per million BTU, whereas in Brazil the lowest price available for gas is US$2.26 for the same quantity, Enron will sell the electricity produced at the Porto Suarez plant to the subsidiary distributor of San Pablo, Electro. According to reports published by *Brasil Energia Magazine*, Enron expects to complete both the Porto Suarez project as well as the Cuiaba combined cycle plant in 2003. This combined cycle generating plant, which is the property of Enron[25] is located close to a node in the Bolivia-Brazil gas pipeline. The plant is slated to be supplied with natural gas produced in Argentina, where Enron is a shareholder in Transportadora Gas del Sur, which owns the segment of the gas pipeline running within Argentina's borders.

Enron's conduct clearly shows the current trend towards horizontal integration of Argentinean and Bolivian basins with the Brazilian centers of consumption as well as vertical integration between natural gas and electric power generation.

[25] Statements of the President of Enron for South America, Michel Guerriero, to *Buenos Aires Económico* (BAE), January 13, 2000.

MERCOSUR

In December of 1999, the full members of Mercosur, Argentina, Brazil, Uruguay and Paraguay, signed a memorandum of understanding concerning gas exchange between the states parties of the region. As part of this agreement, the countries pledged to "develop a competitive gas supply market in the short and long term, by offering to the agents of supply and demand of the sector in each state party, conditions of nondiscriminatory treatment and the possibility of access to the market of the region."

Article 9 of the memorandum specifies that access to remaining capacity of transportation and distribution facilities must be respected, including access to international interconnections. This Article further states that companies may not discriminate on the basis of nationality or (internal or external) destination of natural gas, or on whether a company is public or private, respecting regulated usage rates and contracts currently in force. Additionally, Article 14 establishes protection against monopolistic practices and abuse of a dominant position for all users of natural gas.

This memorandum has been of the utmost importance since it was essentially designed to make sure that the same mistakes made during the experience between Bolivia, Argentina and Brazil were not made again. In that experience, two companies, YPF and Petrobras respectively, either prevented or hindered the participation of rival companies in shaping a competitive energy market.

More companies have now begun to take part in the market as a result of agreements that ensure unrestricted entry and participation. Gas[26] integration between Argentina and Bolivia viable became viable because the TGN network was extended to the Brazilian border and then from that point on, it became interconnected with TGM (Transportadora de Gas del Mercosur) within the borders of Brazil. It is noteworthy that AES is building a combined cycle plant

[26] Export of electricity has also been significant as a result of the Enersis group playing a major role in Yacilec.

(600MW) in Uruguayana (Brazil) that shall be fed by gas produced and transported from the Neuquén basin by TGN, whose shareholders include TotalfinaElf.[27]

Moreover, construction of the Santa Cruz gas pipeline linking Punta Lara in Argentina to Colonia and Montevideo, Uruguay, has recently gotten under way. The consortium that was awarded the contract for its construction is made up of Pan American Energy (40 percent) British Gas (40 percent) and Ancap (20 percent). Eventually, Transportadora Gas del Sur will complete the extension on Argentinean soil to Punta Lara.

Plans are in the making to extend the line to Porto Alegre. This way, the connection between the Neuquén and Austral fields will serve to meet demand in Brazil. This project is viable only because of the extraordinarily high demand found between these two points in Buenos Aires and Montevideo. Consumption rates in both of these two cities are so high that it will help to cover the sunk costs of extending the connections.

Argentina-Chile

In July of 1955, Argentina and Chile have signed a joint economic agreement known as the 'complementary economic agreement' (*acuerdo de complementación económica*), whereby standards regulating natural gas interconnection and supply between the two countries were set forth.

Article 2 of this agreement provides that "the parties shall not place restrictions on producers and other users of natural gas from Argentina and from Chile to export gas to the neighboring country on the basis of their properly certified reserves and availability, for which exporters and importers make a commitment." Furthermore, Article 6 specifies that operation of the gas pipelines shall be governed by a system of open access.

Energy integration between Argentina and Chile has been extensive and of a diverse nature as a result of the signing of this agreement. Completed infrastructure works include the gas pipelines of Magallenes (methanol exporter) in the southern zone; Gas Pacífico and Gas Andes, which transport natural gas from the neuquina and mendocina basins respectively to the Central Interconnected of Chile (SIC) where the main generators (Enersis, Gener and Colbun) have built combined cycle power plants. In northern Argentina, the Norandino and Gas Atacama gas pipelines provide natural gas from the *del noreste* or *noroeste* basin for the Northern Interconnected System (SING) of Chile where growing energy demand, fueled by the mining sector, is expected to rise between 15 and 20 percent over the next years.

Additionally, it should be noted that the Termoandes combined cycle was built near the wellheads of the *noroeste* basin and electricity is being exported to Chile via Interandes high tension lines into the Northern Interconnected System SING. These examples show that integration can come about by means of high tension electric line networks, which transmit electricity produced by gas instead of transporting the fuel to the consuming country and generating electricity in the final destination.

Bolivia-Peru

A final purpose of this paper is to outline the extent to which expansion of the regional market may be possible for producer countries such as Peru, which could provide another alternative in the quest for diversification of supply in a market whose integration is planned by incumbent companies.

The words of Carlos Salinas, the President of YPFB, are of particular interest. Mr. Salinas stated that plans were in the making at this time to build a gas pipeline from the site of gas reserves on Bolivian soil to the Peruvian port of Ilo for export of liquefied gas. Salinas further

[27] Strategic alliance between Gener (currently owned by AES) and TotalfinaElf: These two companies signed a strategic alliance in October of last year. Even though the alliance was voided one month later, it served to be a token of the intent of these companies to integrate the natural gas production business, in which Total has a significant share in Bolivia and is the second largest producer in Argentina and has a share in the main gas pipelines (Gas Andes, TGN, Troansportadora de Gas del Mercosur,), with the electric power generation business, in which AES is the top regional producer.

commented that plans are being drawn up as well for construction of a larger gas pipeline connecting the gas fields of Camisea in Peru with Bolivia and for subsequent distribution into the Brazilian transportation network via the Bolivia-Brazil gas pipeline.

Moreover, bringing Peruvian gas into Bolivia would make it possible to supply the Argentinean and Chilean market by using the pipeline connecting Bolivia to Argentina and the Norandino and Gas Atacama pipelines connecting Argentina to Chile.

Conclusions

It is hoped that further development of natural gas pipelines will come about in the Southern Cone as a result of increased use of natural gas in the overall energy mix in Chile and Brazil as well as Argentina continuing to rely heavily on this resource. It is estimated that by 2010 use of natural gas in the energy mix of Brazil will rise to 12 percent;[28] while Jadresic (1999) estimates that use of natural gas in Chile will account for 23 percent of the energy mix by the year 2005 as compared to only 7 percent in 1994. The project to extend the pipeline between Buenos Aires and Montevideo to Porto Alegre, which recently commenced construction, is a good illustration of such development, since this extension had not even been in the planning stages as of 1996.[29] In any case, gas pipelines will make development of a competitive and integrated gas market possible to the extent that two requirements are met.

The first requirement is that national governments must eliminate economic and administrative roadblocks to gas pipeline development. This could be done by economic integration agreements, such as Mercosur and the Andean Group. This way, unnecessary delays will be avoided such as the recent incident of Camisea, where the Peruvian government postponed commencement of construction for several years.

Additionally, the countries of the region must guarantee competition between different natural gas producers of natural gas by setting clear regulations regarding open access to networks. The cases of YPF and Petrobras in Argentina and Brazil that are the focus of this paper serve as a warning of potential danger when only two producers prevail in a market and abuse their dominant position in natural gas production. YPF and Petrobras respectively control the gas pipelines which interconnect Bolivia with such important markets as Argentina and Brazil. Companies with the capacity to compete with YPF and Petrobras have run into regulatory roadblocks due to privileged arrangements of the national governments with the incumbent actors.

Even though YPF has taken the important step of pledging to cut down on trading in third-party produced gas to the Argentine market and to phase out most-favored-customer clauses in its contracts, these steps in and of themselves are not enough to increase competition in the natural gas market of the Southern Cone. The same can be said about the authorization that was granted that same year for Enron to sell gas using the pipeline between Bolivia and Brazil. In order to move forward in developing these markets and speeding up investment in new transportation networks, it is advisable to take four short-term measures. The first measure is to ensure that the divestment of assets that YPF pledged to carry out in its 1999 commitment is indeed completed. The second measure is to guarantee that the natural gas production market in Bolivia is not cornered or monopolized by YPFB and YPF and their contractual agreements with Petrobras. The third step is for national and regional antitrust agencies, when applicable, to closely examine the impact of alliances between the dominant actors of the region on the way integrated markets work, such as the recent agreements between Petrobras and YPF for participating in joint ventures in Venezuela and Trinidad and Tobago and the exchange of assets in Argentina and Brazil. And the fourth and last measure is to make sure that gas producers in Bolivia and, in the future, Peru, are able offer supply of natural gas production on the Argentinean and Brazilian markets and have open access to the gas pipelines that interconnect the national systems regardless of who these lines are owned by.

[28] Information provided by *Carta Petolera.*

[29] See journal of the CIER, year V, #17, September of 1996.

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