Natural Gas Pipeline Regulation in Brazil: Difficult balance between competition and market development

Edmilson Moutinho dos Santos
(Graduate Energy Program – University of Sao Paulo – Brazil)
edsantos@iee.usp.br
(www.energia.usp.br and www.energiabrasil.com.br)

Abstract

The focus of this paper is Brazilian South/Southeast/Midwest gas system, which is under the influence of the large Bolivia-Brazil gas pipeline – *Gasbol*. The major assumption here is that Brazilian gas demand is growing much slower than supply capacities. Huge gas discoveries in the South Cone of South America, including countries such as Argentina, Bolivia, Peru and Brazil, created an oversupply situation. Producers must find market for their gas and Brazilian consumers seem to be the only reachable option for the moment. As a consequence, all players must get access to this market and open access regulation in existing pipelines became essential.

The expansion of high-pressure transportation facilities in Brazil has been driven mainly by political reasons, before any real demand had been proven. For example, the *Gasbol* has been operating systematically with large idle capacities, creating important short-term inefficiencies in the use of infrastructure. Regulators are expected to promote efficiency through more competition. The establishment of stronger competition by regulation is believed to reduce costs, increase short-term efficiency in the use of pipelines and expand gas demand. However, important issues can be raised regarding Brazil's gas regulation.

First, it is important to explore the difficulties related to the different levels of regulation in Brazilian gas system as well as their different regulatory goals. The Federal government regulates high-pressure facilities, while the low-and-middle-pressure distribution networks are under the control of local states' regulation. There are antagonisms between those two levels of regulatory agencies with distinct objectives and approaches towards competition and market development. The ability of middle-and-low-pressure gas distribution facilities to bring the gas to final consumers is limited and the target of expanding such downstream infrastructure seems to be in conflict with the Federal government's strategy of inciting more competition primarily in the high pressure transportation system.

Second, the conflicts between different perspectives of efficiency must also be considered. Anticipating competition in existing high-pressure transportation system, aiming to improve short-term efficiency in the use of infrastructure, in an infant gas market with low gas demand, may not incite new investments in the future, or may induce investors to build up new pipelines with smaller capacity, lowering, therefore, long-term efficiency.

Finally, the regulation towards competition has also been introduced as a mechanism to reduce the monopoly of state-owned *Petrobras* in the growing gas industry. However, this decision seems also to be in disagreement with other instruments of public policy. *Petrobras* is believed to have the role of gas developer in Brazil. It accepts interference from political forces aiming to boost the construction of large gas projects, including *Gasbol*, regardless the lack of demand. This creates difficulties for regulation to deter dominant position from the state-owned company, who is investing in advance, where private capital would not take the risk, expanding infrastructure and waiting for the demand to catch up. At same time, regulators also have problems to prevent opportunistic behaviors from other companies trying to break

into the market through the idle capacities built by *Petrobras*. Such an antagonism is again mixed up with public policy since the newcomers are international companies, global gas players, very often considered with skepticism by the government and the population, while *Petrobras* is often seen as the national champion.

This paper invites readers to analyze whether Brazil is really ready for a more competitive gas industry or should it alternatively look for other forms of market organization. The difficult balance between competition and demand/infrastructure development is a typical problem in infant industries, particularly in less developed countries. The conflicts between regulation and other instruments of public policy as well as among different levels of regulatory agencies also reflect the immaturity of the system, where the goals and roles of the agents are not clearly defined. The answer for those challenges must take into account the role expected from the state in terms of development strategy.

1. The Brazilian gas market

In the second half of the 1990s, the renaissance of Brazilian gas industry took place mainly due to the construction of *Gasbol*, which became the largest international gas pipeline in the Southern hemisphere (see Figure 1).[1]

Two transporters, the *GTB* in the Bolivian side and *TBG* in Brazil, are the owners and operate the pipeline. Neither *TBG* nor *GTB* own the gas being transported. Their sole role is to provide a gas transportation service from a reception point in Bolivia, where the gas arrives from the different Bolivian production areas, to the "*city gates*" along the pipeline route and locate mainly in Brazil. The two companies are subjected to joint operational agreements. Initially, *GTB* had only one customer in Bolivia, *YPFB*, which was the shipper responsible for buying the gas from the different Bolivian producers and managing to sell it to Brazil. The *TBG* also had only one customer in Brazil, *Petrobras*, which was the shipper in charge of buying the gas from *YPFB* and sell it to different Brazilian distributors.

The construction of *Gasbol* was a historical mark, because it created expectations about radical changes in the structure of Brazilian energy supply. The natural gas was supposed to become Brazil's third energy pillar. In 1999 natural gas had accounted for only 3% of Brazil's total primary energy supply (about 7.6 million toe[2]). Even so, this represented substantial growth compared to its insignificant share of 0.2% (150,000 toe) in the 1970s.

In 1997 the Brazilian gas distribution companies had marketed to final users approximately 10 mcm/d[3] of natural gas. The market then grew in average 20% a year, reaching a total commercialized volume close to 28 mcm/d in 2002. The Brazilian South, Southeast and Midwest regions concentrated about 81% of that

[1] The *Gasbol* has approximately 3,200 km, from which about 2,600 km laid from the border between Bolivia and Brazil to the city of Porto Alegre in the extreme south of Brazil. In the Brazilian side, the pipeline is seen as formed by two sections. The northern section of the pipeline is larger, with 36 inch of diameter and about 1.400 km of extension, going from the border to the city of Campinas in the state of São Paulo. From Campinas, the pipeline derives into two branches. The first serves the city of São Paulo, being connected to other existing pipelines operated by *Petrobras*, and which allows the Bolivian gas to reach as far as the city of Rio de Janeiro. The second branch from Campinas constitutes the southern section of *Gasbol*, extending approximately 1.200 km down to Porto Alegre.

[2] Toe = Tones of oil equivalent.

[3] Million cubic meters per day.

total gas consumption and the market share of the three largest gas distributors in Brazil, *Comgás* (in the state of São Paulo) and *CEG* & *CEG-Rio* (in the state of Rio de Janeiro), represented more than 50%.

It was believed that the Brazilian gas reserves could hardly sustain such market evolution. In December 2001, the proven gas reserves in Brazil were estimated at 220 billion cubic meters (bcm), which could sustain the existing consumption (about 28 mcm/d) for only 21 years. The Brazilian gas reserves had been growing by 6 to 8% a year since 1980. Therefore, its expansion seemed insufficient to support the much stronger demand growth (annual average of 20%).

Apart from being insufficient overall to sustain the market growth in the long run, the Brazilian gas reserves also presented major logistic, environmental and technological difficulties. Most of the reserves were located in the Amazon region (in the middle of the forest, in very sensible environmental areas), or on the Continental shelf. Gas production from those areas was restrained by the lack of infrastructure to extract and transport the gas to the main consuming areas.

Thus, to sustain the growth in its gas industry, Brazil needed to import gas from neighboring countries. In this sense, the synergies that could be explored were immense. In a regional perspective, the picture for gas supply is much more comfortable in the long term. Gas reserves had increased substantially in Argentina, Bolivia and Peru. In 2001, their total proven gas reserves had registered respectively 736, 1,300 and 246 bcm.

Moreover, although gas producers are still working hard to figure out ways to export their product from Argentina, Bolivia or Peru, to overseas, particularly to California (through large Liquefied Natural Gas, LNG, projects), the perspectives of those production schemes are uncertain. Large investments and very long maturation time are needed before those concepts can materialize. Yet, those investments are very risky, since gas prices in California are very volatile and not always competitive to make long-distance gas exporting projects economically viable. Therefore, gas producers in Argentina, Bolivia, Brazil or Peru, are all willing to find opportunities to sell their gas to neighboring countries such as Chile, Uruguay, Paraguay and mainly Brazil.

The gas reserves in the Southern Cone of South America had grown so much that the region had already developed the serious problem of stranded gas. Producers have to find robust demand that can take the gas and reduce the problem of oversupply. For this new scenario, the current development of gas demand in Brazil became insufficient. The Brazilian gas consumption is growing at much slower pace than the supply capacity of the system. The potential supply exceeds by far the demand.

The energy integration in the Southern Cone was expected to speed up with the natural gas. Creating the conditions to develop the regional gas reserves and bring the gas to Brazil became the only sounding strategy for every gas producer in the region. Yet, there are still huge difficulties to convince Brazilian consumers to shift from their traditional energy sources (such as fuel oil, diesel oil or electricity) to gas.

In fact, the *Gasbol* was a major investment in infrastructure built before gas demand had been really proved in Brazil. *Petrobras* had been induced by the Federal government to find out partners and financial resources for the project, because the pipeline was an important geopolitical achievement of President Fernando Henrique Cardoso, who intended to incorporate Bolivia into the regional free trade zone (*Mercosul*). Moreover, the project should consolidate the Brazilian position as a regional power.

Nevertheless, despite all the potential benefits that natural gas can provide to final consumers, cultural and economic barriers still inhibit the adoption of gas as a major energy source in Brazil. The adequate technology for burning the gas with high added value is not available in the country and imports of equipment became too expensive after the major currency devaluation started in 1999. For consumers to

use the gas, they have to invest and change their own energy system. However, the cost of capital became too high as Brazilian interest rates skyrocketed to cope with the exchange rate problems. Moreover, the price of imported gas was also affected by the devaluation, turning the gas much less competitive to substitute other energy sources. Consequently, consumers preferred to keep their traditional energy sources and Brazilian gas demand did not develop as fast as suppliers want and need it. All gas producers in the region have huge difficulties to give value to their gas reserves.

2. The contractual arrangement in the *Gasbol*

Petrobras made the construction and financing of *Gasbol* possible signing all the contracts that guaranteed the total remuneration of the investment, regardless the pipeline was used or not. *Petrobras* also guaranteed the purchase of gas from Bolivian producers in spite of having no enough demand. Thus, *Petrobras* bought the exclusive rights to use the total capacity of *Gasbol*, assuming all the market risks associated to the project.

By accepting high *ship-or-pay* and *take-or-pay* clauses in its gas contracts, *Petrobras* assumed all the risks related to gas demand development. The state-owned company played the role of *developer*, anticipating investments in a major infrastructure and open new energy options for the country as well as new business opportunities for itself.

Petrobras signed a Gas Supply Agreement (GSA) with *YPFB*. For the first year of operation, starting in 1999, the contract previewed an initial supply of 8.0 mcm/d (with *take-or-pay* = 0). The volume to be supplied would grow gradually up to 16 mcm/d starting from the eighth year and until the twentieth. The *take-or-pay* would also increase to 60% in the second and 80% starting from the third year of contract. *YPFB* also granted *Petrobras* the preferential purchasing option for additional volumes of gas up to the limit of 30 mcm/d. This purchasing option would be exercised at any moment over the contractual period, being possible for *Petrobras* to freely decide about its total or partial cession or transfer to third parties.

The GSA also established the price variation formula for the Bolivian gas. For each year over the contractual period, a reference price was defined, beginning, in the first three years, with a price of 0.95 US$/MMBtu (dollars per millions of Btu[4]), and growing gradually up to 1.06 US$/MMBtu in the twentieth year. The annual reference price was supposed to be adopted only for the first quarter of each year, while the contract also provided quarter revisions indexed to a basket of fuel oils.

A Gas Transportation Agreement was signed between *Petrobras* and *TBG*, in the Brazilian side of *Gasbol*, and between *YPFB* and *GTB* for the Bolivian side. Both transportation contracts presented *ship-or-pay* clauses up to 100%. *Petrobras* assumed the commitment of paying *GTB* directly, on behalf of *YPFB*, for the transportation tariff in the Bolivian side of *Gasbol*. Besides, *Petrobras* also bought an option for additional transportation capacity up to 6 mcm/d, denominated as TCO ('Transportation Capacity Option'), having given 81 million dollars to *GTB* as early payment.

Therefore, by signing those *take-or-pay* and *ship-or-pay* clauses and taking the market risks in the *Gasbol*, *Petrobras* made the pipeline economically viable and bankable. On the other hand, the company guaranteed a monopoly right over *Gasbol*'s total transportation capacity. Besides being the major gas producer in Brazil, *Petrobras* also became the only gas importer, meaning an almost absolute control over the gas supply for the country.

[4] Btu = British Thermal Units.

3. The open access regulation for gas pipelines in Brazil

Despite the optimism initially generated by the construction of *Gasbol*, the reality of convincing Brazilian consumers to use the Bolivian gas proved to be complex. In 2001 and 2002, the *Gasbol* transported a daily average of 12 mcm/d, which was compatible with the contractual daily quantities, but far away from the most promising scenarios of accelerated gas consumption growth that could justify any expansion in the pipeline towards its maximum capacity of 30 mcm/d and satisfy the growing anxiety from Bolivian producers, which saw their gas reserves increasing much more quickly.

Moreover, the pipelines, in its first construction stage, where some compression stations were lacking, waiting for the demand to grow, could already transport about 17 mcm/d (see Figure 2). Therefore, some idle capacity was available and other players started to claim for the right to use it. They have been benefited from major changes in legislation and regulation.

In Brazil, the 1995's Constitutional Amendment N° 9 had ended up the former national oil and gas monopoly managed by *Petrobras*. The Law N° 9,478 of August 6th, 1997 (known as the *New Petroleum Law*) started defining the new gas regulatory structure. It created the *National Petroleum Agency* (ANP) to govern and regulate gas production, import/export and transportation activities (see Figure 3).

In particular, ANP was supposed to regulate the open access conditions for gas transportation pipelines. ANP's principles were defined in the Law N° 9,478, including the most important objectives such as stimulating more competition, reducing the market power of dominant players, attracting new investors and organizing their entrance to the market. Having a very immature gas market, the construction of new pipelines still lacked behind in the country. Therefore, ANP assumed the strategy of creating a more competitive environment in the use of existing infrastructure. In November 1998, ANP published its regulation called *Portaria 169*, which established the principle of open access to the natural gas transportation system in Brazil. In particular, ANP concentrated its effort on applying the open access rule to the *Gasbol*, which was operating systematically with excess of idle capacity

According to *Petrobras*, ANP's strategy seeking to promote more competition in the use of *Gasbol* revealed a major change in the rules. All the contracts that had allowed the pipeline to be built had been signed before the approval of the new legislation. However, for ANP, the Law N° 9,478 had not established any exception rule for the *Gasbol*. Thus, it was assumed that the *Gasbol* should also follow the same regulatory policy. Moreover, the open access regulation in the *Gasbol* had become ANP's only more convincing strategy for reducing the dominant position of *Petrobras* in the Brazilian gas supply system.

As shown in the Figure 3, the gas distribution regulation and, therefore, the access to final consumers, has never been under ANP's jurisdiction. The Constitutional Amendment N° 5 of 1995 established that each state in the Federation was allowed to explore (directly or through concessions) its gas pipeline distribution service. Thus, it has been established that gas distribution and marketing activities should operate under the regulation of local states. The governors created their own distributors, privatizing them or just looking for partnerships with private companies or *Petrobras*, usually aiming at future revenues from privatization.

The cases of São Paulo and Rio de Janeiro were special, because the two states inherited from the past the only three gas distribution companies, that had continued to develop, although slowly, until the end of the 1990s. Both states decided then to privatize their gas distributors. Rio de Janeiro split the territory in two concession areas. The Spanish company *Gas Natural* bought the *CEG*, which distributes gas in the city of Rio de Janeiro. *CEG-Rio*, which distributes gas to other cities in the state of Rio de Janeiro, was bought by *Enron*, having *Petrobras* as a minor shareholder (16.3%).

Some states have set up their own regulatory agency to govern and regulate the gas distribution concessions. In the state of São Paulo, the situation became better defined. In 1997 the state created its *Public Energy Utility Commission* (CSPE) with the goal of protecting final consumers against abusive tariffs, supply disruption or discriminatory practices from gas distributors. CSPE was also supposed to help the government to put forward a privatization model, which should maximize the revenues from the gas concessions.

The state of Sao Paulo divided the territory in three concession areas, having the company called *Comgás* as the main asset to be offered to investors.[5] In 1999 *Comgás* was privatized through an auction, being bought by a consortium formed by the companies *BG* (72.7%) and *Shell* (23.2%). The winner bought the existing gas infrastructure as well as the exclusive right to explore (and expand) the gas distribution network in the concession area for 30 years (plus one possible extension of 20 years subjected to CSPE's approval). The winner also obtained the monopoly right to sell the gas to residential and commercial buyers all over the concession period. Furthermore *BG* and *Shell* conquered a temporary monopoly permission, whose duration can last up to 12 years, to sell gas exclusively to industrial users.

The state of São Paulo structured, therefore, a regulated monopoly model for gas distribution and marketing. It was recognized that the middle-and-low-pressure distribution networks were natural monopolies, having no room for competition in the construction of the network itself. However, differently from the model implemented by ANP in the gas transportation sector, the distributors, besides supplying the gas distribution service, were also entitle to the exclusive right market the gas to final consumers. It was established, therefore, an enlarged concept of monopoly for gas distribution, embracing the distribution and marketing. In this regulatory structure, the concept of open access to the network has been discarded.

By postponing a more competitive model in the marketing of the gas to consumers and in the open access to the distribution system, CSPE aimed to maximize the revenues for the state during the privatization process. Furthermore, CSPE also believed that a regulated monopoly could promote a faster and stronger expansion of the gas distribution network. Gradually, the other states in the Federation started to adopt similar regulatory models, following CSPE's approach. They created their own regulatory agencies to structure their respective gas distribution and marketing monopolies. More than anything else, each governor projected to extract larger rents from the privatization of their companies.

4. Exploring the open access regulation in Brazil

BG became *Petrobras*' most important competitor in the South Cone's gas market. As a global player, *BG* also built a prominent position in South America. Before buying *Comgás*, *BG* had already bought *Metrogas*, Argentina's largest gas distributor, in 1991. Moreover, *BG* holds the second largest gas reserves in Bolivia, a share in the *Gasbol* and other in the *Cruz Del Sur* gas pipeline, connecting Buenos Aires to Montevideo.

Petrobras and *BG* are competing for market shares on all the different segments of the South Cone's gas industry. Both companies are trying to build up vertically integrated businesses, connecting large gas reserves in Argentina, Bolivia and Brazil, to consumers in Brazil. Having no alternative markets for their

[5] *Comgás*' concession area would hold a population of approximately 25 million inhabitants (6.3 million households), representing about 36% of Brazil's GDP. Moreover, it embraces the most concentrated industrialized region in Latin America. Thus, *Comgás* is certainly the largest gas distributor in Brazil with the most promising perspective.

gas in the region, the two companies understand the crucial role of having access to Brazilian consumers. Both companies know that the definition of open access regulation for *Gasbol* will play a decisive role in defining winners and losers in this regional gas game.[6]

In September 2000, *Enron* (through its subsidiary *Enersil*) and *TBG* , the operator of *Gasbol* in the Brazilian side, signed a service contract for 'Non Firm Transport' of 1.0 mcm/d, during one year. The signature of this contract was only possible after the intervention of ANP, since *Enersil* and *TBG* were unable to reach an agreement about the tariff for such 'Non Firm' service.

Enersil had asked for a tariff 25% lower than the one charged by *TBG* to *Petrobras* for a 'Firm' contract. It alleged that a 'Non Firm' service had lower quality and should be less costly. On the other hand, *TBG* sustained that the 'Non Firm' service was not really available. Given the enormous idle capacity in the *Gasbol*, *Enersil*'s 'Non Firm' service would have low probability to be broken over the contract period (1 year). In practice, *Enersil* would buy a 'Firm Transport'. Therefore, the tariff could not be lower than what Petrobras was paying for its 'Firm' contract.

According to *TBG*, the situation should actually be reverse. As the contract to be offered to *Enersil* was much more flexible, since it did not include *ship-or-pay* clauses, the tariff to be paid by *Enersil* should be higher than the one paid by *Petrobras*. The argument was that the transporter should not encourage the migration of 'Firm' contracts, signed by *Petrobras*, that had allowed the pipeline's financing, to 'Non Firm' contracts. Such a migration would compromise the economic stability of *Gasbol*. Losing its 'Firm' contracts with *ship-or-pay* clauses, *TBG* would have to increase all the transportation tariffs to maintain its expected return.

For solving the conflict, ANP determined that the 'Non Firm' service to be offered to *Enersil* should adopt the same tariff paid by *Petrobras* in the 'Firm' service. This first conflict between *Enersil* and *TBG* defined ANP's jurisprudence in the subject. The same solution was again adopted in another similar conflict, between *TBG* and *BG*, always related to the cession of open access into *Gasbol* for a 'Non Firm' service. Neither *Enersil* nor *BG* were obliged to transport after the signature of the transportation contract. Since they have not obtained a significant competitive advantage in the transportation tariff, they ended up by not transporting and there has been no practical consequence of all these struggles.

However, in September of 2001, *BG* decided to assume an even more aggressive position. For the first time, the company asked *TBG* for the open access right to *Gasbol* with a 'Firm' contract. *BG* wanted to become the first independent shipper to transport in 'Firm' conditions about 2.0 mcm /d in the *Gasbol*. Again, there has been resistance from *TBG* and *Petrobras*. ANP was, once more, called to arbitrate in the conflict.

BG was granted by ANP the right to a firm capacity in the *Gasbol* for a determined period of time (initially 1 year, until 2002). Thus *BG* became the first independent shipper transporting gas in firm conditions through the *Gasbol*. ANP was able to celebrate its first real victory breaking *Petrobras*' gas transportation monopoly in Brazil. *BG* started supplying its own gas to *Comgás* in October 2001 (see Figures 2).

BG's open access to *Gasbol* raises, nevertheless, an interesting contradiction since *BG* itself holds monopoly right over the most important gas distribution network in the state of São Paulo, *Comgás*. There

[6] *Enron* was also a major player in this game. Apart from also holding important gas reserves in the region, the American company is a major owner of *Gasbol* as well as a partner of *Petrobras* in several gas distribution companies in Brazil. However, after *Enron*'s financial collapse, the future of its assets in South America is uncertain.

is no open access condition being applied to gas distribution as the state level regulator granted exclusive rights to distributors. In other words, ANP deciding to introduce competition in the first place in gas transportation, such a competition will be in conflict with the strategy of local state's regulators that do not want to promote early competition in gas distribution. They follow other important long-term objectives such as inciting the network expansion with moderate costs and tariffs, which is equally necessary for developing such an infant market. Moreover, some states still look forward to maximizing their revenues in future privatization of distributors.

In a market with shortage of gas consumers, *BG* shipping its own gas through the *Gasbol* to *Comgás* means even more difficulties for *Petrobras* to fulfill its *take-or-pay* and *ship-or-pay* obligations in the initial contracts of *Gasbol*. A gas retail market is missing and may take years to develop. As such, the anticipation of a free gas wholesale market will likely create serious conflicts. A fully and effective competition in transportation may only be possible when the market consolidates and the access to final consumers will be opened.

5. Conclusion

Although historical, ANP's first initiatives to promote more competition in the gas shipping business was limited and may not be sustainable overtime. Initially, the *Gasbol* had a small and declining idle capacity, reducing the opportunities for newcomer like *BG*.

However, in 2003, *TBG* was obliged to anticipate the expansion of *Gasbol* to supply numerous gas-fired power plants that were supposed to be built in the country during the electricity shortage of 2001 and 2002. A strong gas demand for power generation will not materialize since most of the projects have never been launched. Thus, the idle capacity in the *Gasbol* will increase tremendously and other shippers will be tempted to claim the open access to that available capacity (see Figure 2). Actually, they may even increase their commitments and stakes to fill up that larger available capacity in the *Gasbol*. In this case, they may no longer accept temporary solutions as in the past.

As a consequence of a series of poorly formulated public policies aiming to induce the fast expansion of infrastructure with non sustainable gas demand to anchor it, *Petrobras* will likely have to support growing losses as ANP manages to anticipate in many years the open access condition for high-pressure pipelines. Such a regulation may allow the sustainable and long-term entry of new players in the Brazilian gas shipping business at the expense of the state-owned company. Incidentally, *Petrobras* will have created its own trap by committing itself with the government policy of promoting the fast expansion of *Gasbol*. Much earlier than expected and even before the fulfillment of its contractual obligations, *Petrobras* may lose its monopolistic position as the only shipper in the *Gasbol*.

Petrobras will keep claiming its role as gas developer, sustaining that it cannot suffer huge losses when it has the obligation to fulfill the government's energy policy. On the other hand, *BG* will always support that *Petrobras*' development strategy should never lead to dominant position and monopolistic behavior. Moreover, as the company can integrate its gas reserves in Bolivia to gas consumers under *Comgás*' distribution concession, *BG* may claim its right to offer better supply contracts to final consumers, helping to increase demand and consolidate its market.

Other investors must look at the outcomes of this struggle very carefully. Many other gas pipelines are planned in the Southern Cone (see again Figure 1). Sponsors of those projects will still have to take high risk to develop an infant demand. However, knowing that ANP's regulation may subsequently allow other shippers to have access to idle capacities in the new pipeline, investors may give up overall the projects or may reduce its dimension, trying to create entry barriers for future shippers.

As a result, the same regulation aiming to promote more short-term efficiency in the use of *Gasbol* may actually induce long-term inefficiencies. By reducing potential investments in new gas pipelines, several consumers will probably be excluded from the gas market. They will be out-of-reach from gas infrastructure. Other consumers will be connected to the gas market, but paying higher gas prices in the long term, because important economies of scale will be lost in the pipeline construction. Eventually, gas may even lose competitiveness against other energy sources, making consumers not to shift from other less efficient energy alternatives to gas. Brazil will lose the opportunity to build up an important energy option and improve substantially the overall efficiency of its energy matrix.

7. References

ANP (2002); Anuário Estatístico Brasileiro do Petróleo e do Gás Natural 2002. MME, ANP.

Estado de São Paulo (2003); “Projetos param e turbinas a gás encalham”. Caderno Econômico, 06/04/2003, pp. B6.

IEA (2001); *World Energy Outlook – 2000*. Paris, OECD, International Energy Agency.

Moutinho dos Santos, E.; Zamalloa, G.C.; Villanueva, L.D.; Fagá, M.T.W. (2002); *Gás Natural: Estratégias para um energia nova no Brasil*. Ed. Annablume, São Paulo