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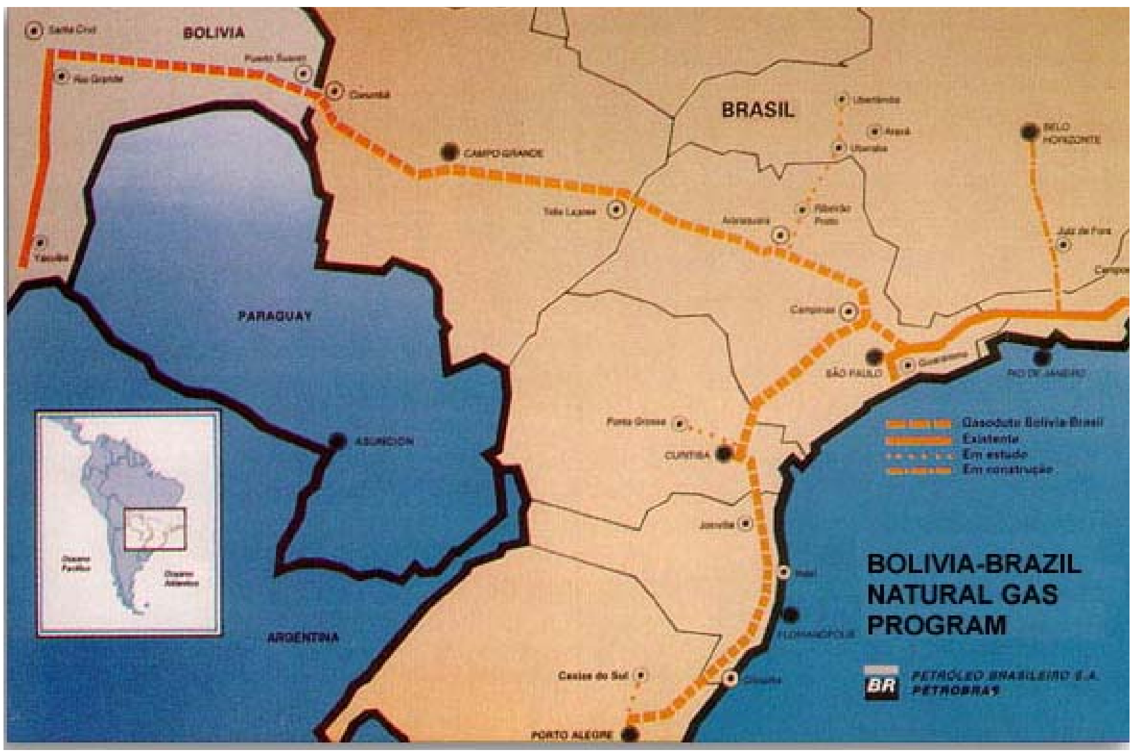
Case Study From

NEW ERA IN OIL, GAS & POWER VALUE CREATION

The Bolivia-to-Brazil Pipeline[1]

The Bolivia-to-Brazil (BTB) gas pipeline is 3,150 km long, including a 557 km portion from Santa Cruz de la Sierra in Bolivia, to the Bolivian border near Corumbá in Brazil, which is owned and operated by the Gas Transbolivariano S.A. (GTB). On the Brazilian side, the 32-inch pipeline continues from Corumbá to São Paulo, and then with a smaller diameter pipeline to Porto Alegre; it is owned and operated by the Trasnportadora Brasileira Gasoduto Bolivia-Brazil S.A. (TBG). The $2 billion BTB gas pipeline is the single largest private sector investment in Latin America.

- *How was the project financed, and what was the role of the state companies?*
- *What is the tariff structure for the pipeline?*
- *What are some capacity, political and upstream issues associated with this project?*



Source: Petrobras

Background

In the 1990s, hydropower, petroleum and wood/sugar cane derivatives each accounted for about one-third of Brazil's energy supply, with natural gas contributing only 2%. At this time, Brazil was forecasting strong growth in energy demand, and imports of natural gas from Bolivia offered the possibility to offset an increasing dependence on polluting and more

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

expensive fuels. On the other side, Bolivia had been exporting gas by pipeline to Argentina since the 1970s, but new discoveries in Argentina decreased the demand for Bolivian gas. It was critical for Bolivia to find an alternative export market, since gas sales to Argentina represented 80% of Bolivia's total gas production. It was thought that future gas exports to Brazil could represent 25% of Bolivia's total export earnings.

In 1991, the Brazilian and Bolivian governments decided to re-examine the gas export project, which had been an unrealized dream of both countries for some 40 years. (Bolivia has been producing natural gas since the 1960s.) After making a preliminary feasibility study, the two state monopolies, Petrobras and Yacimientos Petrolíferos Fiscales Bolivianos (YPFB) signed an agreement in 1993 for the sale of 8 to 16 MMcm/d (283-565 Mcf/d) of natural gas over a twenty year timeframe.

In 1994, Petrobras, which was still obliged to take a controlling interest in any new gas transport company under prevailing Brazilian law, selected the BTB consortium formed by British Gas (BG), Tenneco (now El Paso) and Broken Hill Petroleum (BHP, whose participation has since been aquired by TotalFinaElf) to cosponsor the Brazilian transport company. The private partners soon began to tell the government that fair access to downstream markets and good pricing policies would be important for the project.

In both Bolivia and Brazil, there was a growing perception that private participation in the energy sector could bring economic benefits and lessen the risks taken by governments. In Brazil, the Hydrocarbon Law No. 9478 – intended to dismantle the monopoly of Petrobras and open the sector to private competition – was approved in 1997. The Law defines the objectives of the national energy policy and creates a federal regulatory agency for the hydrocarbon sector (*Agência Nacional do Petróleo*, ANP). It calls for increases in the economic use of natural gas and competition for the development and use of energy resources. In Bolivia, the Hydrocarbon Law, passed in 1996, committed Bolivian reserves to the export project and defined a new role for YPFB as the aggregator and shipper of future gas exports through the Bolivia-Brazil pipeline. The capitalization of YPFB followed shortly thereafter and resulted in two private upstream companies and one oil and gas transportation company.

The BTB project

The Project comprised the construction of a 32-inch gas pipeline from Santa Cruz de la Sierra in Bolivia to Campinas in Brazil, continuing with a smaller diameter (24 to 16 in) to Porto Alegre (the southern leg). The total length of the pipeline is 3,150 km, with 2,593 km located in Brazilian territory. The pipeline is designed to achieve a maximum throughput capacity of 30.1 MMcm/d (1.06 Bcf/d) with full compression.

Although the initial gas supply agreement between Petrobras and YPBF only committed YPFB to supply up to 16 MMcm/d (565 Mcf/d), the project sponsors agreed to proceed with the larger capacity pipeline on the likelihood that additional supplies would become available, recognizing that a phased increase in compression would be needed to accommodate the higher throughput volumes. Each of the sponsors would participate in both of the national transportation companies – GTB in Bolivia and TBG in Brazil. Both companies have Petrobras as partner through its subsidiary Gaspetro; the BTB Group; Enron (Bolivia) C.V.; Shell and Fundos de Pensão Bolivianos.

TBG and GTB partners

TBG PARTNERS	%	GTB PARTNERS	%
GASPETRO – PETROBRAS GAS SA	51	GASPETRO – PETROBRAS GAS SA	9
BBPP HOLDINGS LTDA	29	BBPP HOLDINGS LTDA	6
ENRON	7	ENRON	30
SHELL	7	SHELL	30
BOLIVIAN PENSION FUNDS	6	BOLIVIAN PENSION FUNDS	25

Source: Gaspetro

In August 2002, after it filed for bankruptcy, Enron formally put its assets associated with the BTB pipeline up for sale. The company received offers through the end of 2002, but no sale occurred. Enron's ownership share most likely will be transferred to a new entity, PipeCo, to be owned by the company's creditors.

The entire BTB project comprised three components:

- Component 1: Construction of the pipeline on the Bolivian side from Santa Cruz de la Sierra to the Bolivian border near Corumbá in Brazil.
- Component 2: Construction of the main trunkline from Corumbá to Campinas, including the lateral extension to Guararema and two compressor stations, and the southern leg to Porto Alegre, including two compressor stations.
- Component 3: All the soft costs related to the Brazilian section of the pipeline, including interest during construction, development and management costs, debt service reserve fund, and working capital.

Upstream Issues

Implementation of the BTB pipeline project attracted private investment to exploration and production in Bolivia, resulting in sufficient additional reserves to make up the supply shortfall. Between 1997 and 2000, private companies invested $1.9 billion in oil and gas upstream activities in Bolivia, with a further $530 million committed in 2001. According to the World Bank, this has led to a 700% increase in Bolivia's proven plus probable gas reserves – to 1,324 bcm (46.8 tcf) – and these reserves are currently under active development by 14 private production companies with wide international representation in ownership, including PEB (the Petrobras subsidiary in Bolivia), Total, Repsol, British Gas and Pluspetrol.

Financing

The World Bank, the Banco Nacional de Desenvolvimento Econômico e Social (BNDES) from Brazil, the InterAmerican Development Bank (IADB), the European Investment Bank (EIB) and Corporación Andina de Fomento (CAF), an organization of 12 Latin American and Caribbean countries, were the development institutions that supported the project. Export credit agencies, such as the Japanese Import-Export Bank, also were an important source of financing. While the borrower and the guarantor were a Brazilian firm and the government of Brazil, respectively, the legal documents provided coverage for the commitments for execution of the environmental and social management program in Bolivia.

A combination of multilateral lending, export credits, and partial credit guarantees offered the long-term financing necessary to achieve a gas price which would allow gas to penetrate the existing energy market. For this reason, the Brazilian government indicated early in the appraisal process that it would be prepared to provide the necessary guarantees for such a financing package.

However, multilateral financing and partial credit guarantees were not an option for the Bolivian side, since its transportation company was structured as a fully private venture for which sovereign guarantees – required from the Bolivian Government for multilateral support – were not available. Nevertheless, the new owners of the transportation company in Bolivia were not coming up with the required financing and seemed not to attach the same urgency as Petrobras to start construction. It became increasingly clear to Petrobras that the Bolivian segment of the pipeline – amounting to about 20% of overall construction costs – was impeding the realization of the entire project. Thus, Petrobras, which had also been contracted to oversee pipeline construction in Bolivia, decided to mobilize financing for the Bolivian pipeline as well.

Petrobras solicited an international tender for construction of the Bolivian segment along the general lines of International Competitive Bidding (ICB) practiced by the World Bank/IADB (without any involvement of the banks), and passed through financing terms which it obtained for an equivalent amount of borrowing in the market, based on its own balance sheet. These terms had only a limited impact on the ultimate cost of gas transportation – and thus on the gas price in Brazil – because of the relatively small weight of the Bolivian segment of the pipeline in total construction costs. However, financing of the entire pipeline based on these terms would not have been feasible, as the shorter maturities would have, during the initial phase, required gas prices too high to effectively penetrate the market.

TBG-Petrobras Pipeline Throughput Volumes (MMcm/d)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2010	2015	2018
TCQ	2.2	9.1	10.3	11.4	12.6	13.7	14.9	16.0	18.1	18.1	18.1	18.1
TCO	0.0	0.0	0.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
TCX	0.0	0.0	0.0	0.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
TOTAL	2.2	9.1	10.3	17.4	24.6	25.7	26.9	28.0	30.1	30.1	30.1	30.1

Note: Actual flows up to 2001 and contracted flows after 2001 are presented.
TCQ: Transport Contract Quantity (refers to the initial contractual volume of 16 MMcm/d).
TCO: Transport Capacity Option (refers to 6 MMcm/d of pipeline capacity above TCQ).
TCX: Additional Transport Capacity (refers to 6 MMcm/d of pipeline capacity above TCO+TCQ).
Source: World Bank

Throughput Volumes

Due to the macroeconomic difficulties experienced in Brazil during 1999, the gas market did not develop at the anticipated pace. This caused Petrobras and TBG to renegotiate the transport agreements according to revised expectations of the market. As a result, Petrobras reduced its TBG capacity commitment through 2002, while increasing its commitment for the subsequent period. Under the current signed gas transport contracts, the maximum throughput capacity of the pipeline will be reached by 2007. While this represents a speedier uptake of gas than anticipated at appraisal, current negotiations between Petrobras and TBG will further accelerate the flow ramp up and bring the full capacity utilization of the pipeline forward to 2003.

There were two main features in the pipeline transportation contracts. The “if tendered” feature guarantees YPFB that Petrobras will pay the agreed commodity price for specified quantities of gas that YPFB succeeds in delivering to the Brazilian border, whether or not Petrobas can market the gas. The “ship or pay” feature assures GTB and TBG that Petrobras or YPFB will pay the tariffs relating to specified quantities of gas to be transported on their pipelines, whether or not those quantities are actually shipped (unless the inability to ship or deliver gas results from an operational failure on the pipeline).

The construction of the trunkline from Santa Cruz to Campinas to Guararema (Component 1) was completed in late March 1999, and commercial gas deliveries to Comgas commenced in June 1999. For the southern leg (Component 2) first commercial gas deliveries were made in March 2000, right after construction completion.

Regulations

The ANP has issued a comprehensive set of regulations designed to promote private participation and competition in the supply of natural gas. Specifically, these include regulations that mandate non-discriminatory third party access to gas transmission pipelines; establish gas transport tariffs taking into account volume transported and transportation distance; specify procedures for arbitration by the ANP in the case of tariff disputes; and specify procedures to be followed for the importation of natural gas by public and private enterprises.

The regulations related to gas transmission issued by the ANP are applicable to the BTB pipeline, even though the regulations were issued by the ANP during project implementation. These provide for third party access, and for firm and interruptible services for uncommitted capacity, in the pipeline. The ANP and SCG defined the following tariffs for capacity, plus a movement (volume) tariff equal to $0.002 per MMBtu.

Capacity Tariff ($/MMBtu)

Entry Point	2001	2002
Rio Claro	0.975	0.980
Limeira	0.990	0.995
Americana	1.008	1.013
Jaguariúna	1.028	1.033
Itatiba	1.062	1.067
Guararema	1.137	1.143
Sumaré	1.036	1.041
Campinas	1.046	1.052

Source: ANP

In July 2000, the ANP arbitrated its first dispute concerning the transport tariff offered by TBG to a third party shipper (ENERSIL, an Enron company) that had requested use of available capacity (above the TCQ) to the BTB pipeline on an interruptible basis, and in April 2001 its second dispute concerning the provision of firm transport services to BG. The ANP ruled in favor of the third party shippers to allow access to the BTB pipeline against strong opposition from Gaspetro. These were the first third party shippers granted access to a gas transmission pipeline in Brazil.

According to the ANP and Superintendência de Comercialização e Movimentação de Gás Natural (SCG) in the BG dispute, TBG modified the maximum capacity evaluation for the pipeline to consider only the contracts with Petrobras without offering capacity to third parties. The results of the modified evaluation determined no excess capacity for the pipeline. Currently, BG lost access to the BTB pipeline as GTB decided that Petrobras has priority access. BG sent lawyers to Bolivia to attempt to reverse the situation.

Related to this situation, Petrobras invested in 14 power generation plants with a total of approximately 6,000 MW of capacity. Petrobras, as minority owner in these generation projects, is responsible for the natural gas supply. If the company does not supply the required quantities it can be taken to court for contract nonfullfilment.

As of April 2002, Petrobras has control of the BTB pipeline. Although the ANP tried to allow open access to the pipeline, it failed because it could not impose regulations on the Bolivian side. Petrobras also wants to control any expansion of the pipeline. Since December 2001 – when BG lost access to the BTB pipeline – Comgas (the company that signed a contract with BG) has been buying gas from Petrobras at prices 5% to 10% more than those contracted with BG. Also BG has been paying $5 milllion every month to GTB and TBG for transportation charges arranged in a previous contract.

Brazil has been facing low levels of competition in the natural gas markets in part due to Petrobras' vertical integration in this market. (Petrobras produces, transports and sell natural gas and also controls the production of gas substitutes). The ANP has been trying to convince Petrobras to sell its controlling interest over the BTB pipeline, but so far Petrobras' president, Francisco Roberto André Gros, has seen the idea as an intrusion from ANP. To increase competition in the natural gas market, Petrobras is planning to decrease transportation tariffs. The ANP has supported this idea but the legal framework is still under evaluation.

Sources:

EIA Country Analysis Brief, http://www.eia.doe.gov/emeu/cabs/bolivia.html

The Oil & Gas Journal, various issues (searched via the web site, www.ogj.pennnet.com/home.cfm)

Superintendence of Hydrocarbons, http://www.superhid.gov.bo/