

# Viewpoint

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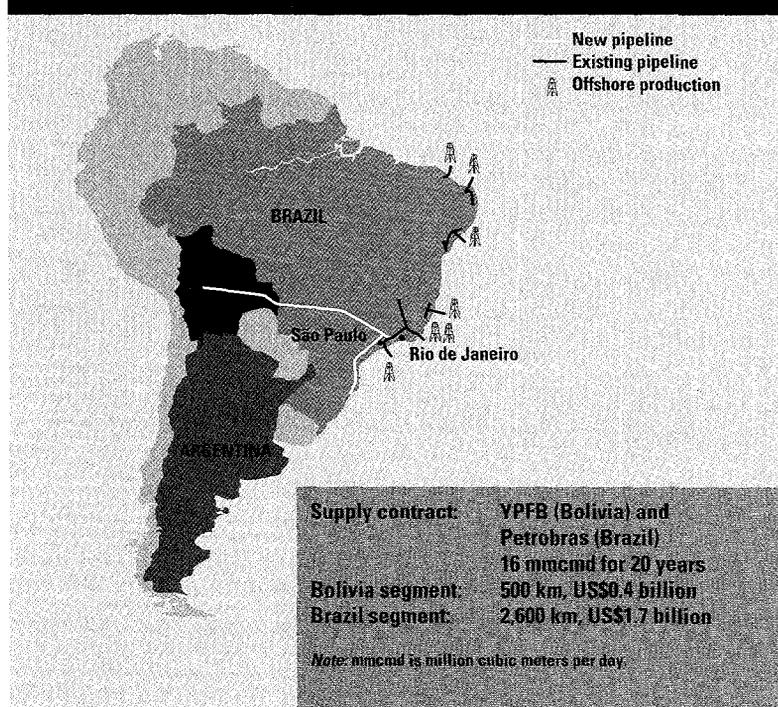
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## International Gas Trade— The Bolivia-Brazil Gas Pipeline

*Peter L. Law  
and Nelson  
de Franco*

The Bolivia-Brazil natural gas pipeline, which will transport natural gas more than 3,000 kilometers, will cost US\$2.1 billion to construct. Despite the substantial benefits for both Bolivia and Brazil and the involvement of reputable private partners, the perceived risks and complexities of this large project made financing it a major challenge. The pipeline will link supply in one country to a potential market in another. Neither of these countries has a tradition of independent regulation or economic pricing of fuels. And the pipeline will be the first major gas infrastructure project involving the private sector in Brazil, where the natural gas market is underdeveloped and the gas distribution infrastructure still very limited. This Note explains the historical factors that shaped the project, how the financing package came together, and the role the pipeline will play in liberalizing the Brazilian hydrocarbon sector.

FIGURE 1 THE BOLIVIA-BRAZIL NATURAL GAS PIPELINE



When the pipeline project started to get off the ground in the early 1990s, the Brazilian hydrocarbon sector was dominated by government-owned entities and prices were heavily regulated. At the federal level the oil and gas company Petrobras, the main player in the project, still had a monopoly on exploration, exploitation, refining, and maritime and pipeline transportation. Natural gas distribution was reserved for state-owned distribution companies, although petroleum distribution was open to foreign investors. Prices were equalized across regions, and the prices of liquefied petroleum gas (LPG) and fuel oil were subsidized. For Petrobras exploiting Brazil's modest natural gas reserves had been secondary to producing oil, and the share of natural gas in the energy market in the early 1990s was a mere 2 percent. Petrobras had introduced natural gas only in 1988, supplying small quantities to the existing São Paulo distribution network as associated gas from local oil fields.<sup>1</sup> But with Brazil forecasting strong growth in energy demand, natural gas gained appeal as a means to offset increasing dependence on more





expensive fuels. Meanwhile, Bolivia needed to find a new market for gas exports. The country had been exporting gas by pipeline to Argentina since the 1970s, with these export sales representing some 80 percent of Bolivia's total gas production, but new discoveries in Argentina gave notice that this was no longer tenable. The idea for natural gas trade between Bolivia and Brazil had been around since the 1930s, and in 1990 the two governments decided to give a gas export pipeline another serious look. After a preliminary feasibility study the two state monopolies, Petrobras in Brazil and Yacimientos Petroliferos Fiscales Bolivianos (YPFB) in Bolivia, signed a gas sales contract in 1993.

### Private investors emerge

Neither government was in a position to fund the pipeline project. As a first step to raise private finance, Petrobras embarked on a series of roadshows in 1994 to choose private equity partners for a new pipeline company on the Brazilian side. Petrobras ultimately selected the BTB consortium, comprising British Gas, Tenneco (now El Paso Energy), and Broken Hill Proprietary, to form the Brazilian transport company (Transportadora Brasileira Gasoduto Bolívia-Brasil, S.A. [TBG]). This company, with an initial 51 percent ownership by Petrobras, would own the Brazilian part of the pipeline. However, the private partners began to signal to the government that fair access to downstream markets and market-based pricing policies would be important for the realization of the project—policies in line with those recommended earlier by the World Bank to the Brazilian government as key for the development of the hydrocarbon sector. In late 1995 an amendment to the Brazilian constitution removed the Petrobras monopoly, subject to an implementation law that was approved by Brazil's Congress in August 1997.

On the Bolivian side an agreement of association was reached between Enron and YPFB that included the development of the Bolivian section of the pipeline. YPFB was being prepared for capitalization and sale by international tender. A hydrocarbon law passed in 1996 committed

Bolivian reserves to the export project and defined a diminished (but still critical) role for YPFB as the aggregator and shipper of future gas exports to Brazil. The capitalization of YPFB followed shortly after, and two private exploration and production companies and one oil and gas transportation company eventually won the international competitive tender. The Bolivian transportation company, Gas Transboliviano S.A. (GTB), was formed for the gas export project as a private joint venture among Enron, Shell, and Bolivian pension funds.

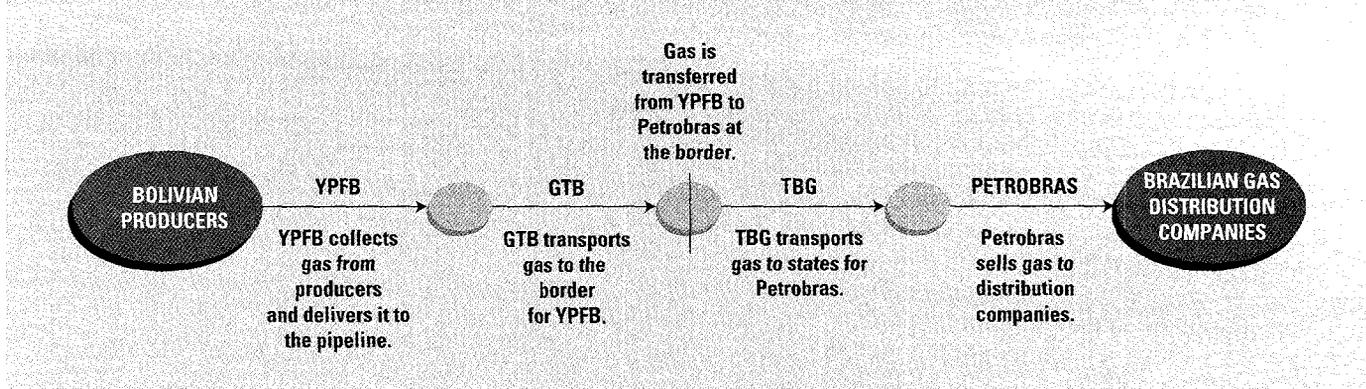
The project structure allowed a degree of cross-border ownership by each sponsor group, and special committees were formed with representation from all sponsors to resolve technical and financial issues and ensure cross-border harmonization of the project. This feature proved effective in helping to speed up project development.

### A financing plan takes shape

In 1997 the project still lacked a firm financing plan. The project required a large, bulky, upfront investment with a gradual buildup of tariff revenues, and a final gas price that would provide incentives for a speedy uptake of gas by potential customers—industrial users and power plants. Market soundings had indicated a lack of capacity for long-term commercial funding. Commercial debt would be high cost with short maturities (eight to ten years) because of perceived Brazilian country risk, regulatory risk, and supply risks, resulting in debt service difficulties and a final gas price that could severely limit market penetration during the critical initial years. (Commercial lenders perceived some supply risks, since known Bolivian reserves were only sufficient to meet 80 percent of the gas sales contract. But in the World Bank's view the risks were likely to be small because the capitalization of YPFB had attracted some US\$1 billion of private capital for further exploration and development.)

In 1997 the World Bank and its multilateral counterparts, convinced that both countries were serious about opening their hydrocarbon sectors

**FIGURE 2 THE BOLIVIA-BRAZIL PIPELINE—TAKE (AND SHIP) OR PAY FRAMEWORK**



to competition and private participation, decided to appraise the project on the understanding that transmission tariffs (and private investor rates of return) would be regulated to ensure that any benefits of extended maturities resulting from their loans and guarantees would be passed on to final consumers. A World Bank analysis showed the project to be economically viable and the best of several alternatives, including using different pipeline routes from Bolivia, constructing a pipeline from Argentina to Brazil, and constructing large gas-fired power plants in Bolivia and transporting the power to Brazil using high-voltage transmission lines. (The final pipeline route was selected to minimize environmental impact, and the project includes full measures to protect the interests of indigenous people living near the pipeline). On the Brazilian side multilateral lending and partial credit guarantees offered the prospect of longer loan maturities and a gas price just right to penetrate the market. Thus the World Bank agreed in December 1997 to provide a direct loan of US\$130 million and to continue preparing a partial credit guarantee of US\$180 million to TBG. Other multilaterals, including the Inter-American Development Bank, provided financing totaling US\$380 million. The multilateral financing covered 40 percent of the financing requirements as senior debt, Petrobras provided another 40 percent sourced from bilateral agencies, and the equity sponsors provided the rest.

On the Bolivian side only 20 percent of financing was available from shareholder equity. With the Bolivian government unprepared to provide sovereign guarantees, little progress was being made to close the financing gap. The Brazilian government, realizing that this threatened to de-

lay the project until a new government was elected, urged Petrobras to quickly seek a solution. Petrobras responded through two mechanisms. First, it agreed to finance a fixed price turnkey construction contract for the Bolivian section of the pipeline, with repayment to be made through the waiver of future transportation fees. Second, it agreed to prepurchase part of the uncommitted upside capacity of the pipeline on both sides of the border, an arrangement that became known as the transport capacity option.

### Who takes the risks?

Petrobras bears most of the project risk on both sides of the border. YPFB will collect gas from the producers, and the gas will be transported to the border under a ship-or-pay contract with GTB (figure 2). Here, Petrobras will take ownership of the gas for delivery to the five Brazilian state gas distribution companies under similar transportation arrangements with TBG.

The supply risk on the Bolivian side falls on YPFB. But this risk is small because of additional supply likely to become available from new discoveries in southern Bolivia and possibly northern Argentina. The biggest risk lies in the market in Brazil. Four of the five distribution companies are paper companies with as yet no pipes in the ground, and gas will have to penetrate a market dominated by high-sulfur fuel oil. (Petrobras has an equity stake of about one-third in several of the distribution companies.<sup>2</sup>) Although the ultimate market risk lies with the distribution companies, it is Petrobras that is contractually obligated to pay YPFB for the gas and the transportation companies for their transportation services.



Moreover, through its turnkey construction contract, Petrobras takes the construction risk on the Bolivian side. And if the pipeline in Brazil is not built on time, it is Petrobras who will incur financial penalties payable to YPFB and the distribution companies.

### Toward sector liberalization

The size and scope of the pipeline give it the leverage to play a key role in opening the Brazilian hydrocarbon sector to competition and private participation. The project and accompanying policy reforms will establish the principles of unbundling and transparent pricing in transactions between gas supply, transportation, and distribution. The pipeline will help promote interfuel competition in Brazil by allowing a large increase in gas supply, and increase the number of players in the market by making the upside capacity of the pipeline available to shippers other than Petrobras.

During the project preparation stage it was still unclear to what extent Brazil's hydrocarbon sector would be opened to competition, as the hydrocarbon law was not passed until later. The World Bank therefore sought to include good practice policy principles relating to open access, ownership, and pricing in the authorization agreement between the government of Brazil and TBG that sets out the parameters under which the pipeline will eventually operate. These policies include nondiscriminatory third-party access, the adoption of distance-related transmission tariffs for the uncommitted upside capacity of the pipeline, and the requirement that TBG would act only as a gas transporter and not engage in gas trading or upstream or downstream cross-ownership. Although Petrobras will be the dominant shareholder of the Brazilian transportation company for a transition period, the Brazilian government has agreed with the World Bank to eventually maximize private participation in the project. To initiate this too quickly would risk unraveling the many complex project agreements already reached and fail to maximize the value of the Petrobras shares. The govern-

ment will therefore submit a plan for eventual reduction of Petrobras's shareholding in a way that will ensure the best chances for commercial success.

As part of the agreements reached with the World Bank, the Brazilian government has developed a plan to phase out fuel price subsidies and deregulate petroleum product prices within a three-year transition period (from August 1997). The concept of distance-based transport tariffs, a departure from the traditional pricing mechanisms, will encourage use of the best fuel supply option in each area of Brazil. Open access to transmission systems, combined with increased private participation in upstream development, will be a major force in controlling extraction costs and increasing supplies of domestic gas in Brazil. It will ultimately lead to wider choices for consumers, allowing large consumers to negotiate directly with producers and importers for the best commercial terms.

### Conclusion

Many prospective international gas pipeline projects are under consideration—projects in Central and South Asia, and projects proposing pipelines from Russia to China and from Turkey to Eastern Europe. Given the large investments required, the main challenge is to design financing schemes that work. There are few blueprints to draw on. The World Bank can play a key transitional role in such projects. But there needs to be demonstrable commitment to opening the natural gas industry to competition and private investment and establishing sound regulatory and pricing policies.

<sup>1</sup> The São Paulo distribution network was originally constructed to distribute manufactured gas.

<sup>2</sup> To counter Petrobras's bargaining power, the distribution companies used collective negotiations to achieve acceptable price and take-or-pay conditions, an approach that proved highly effective.

*Peter L. Law (plaw@worldbank.org),  
Energy Specialist, and Nelson de  
Franco (ndefranco@worldbank.org),  
Principal Power Engineer, Oil and  
Gas Thematic Group*



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